

FOOD MANUFACTURE

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Forty-seventh year of publication

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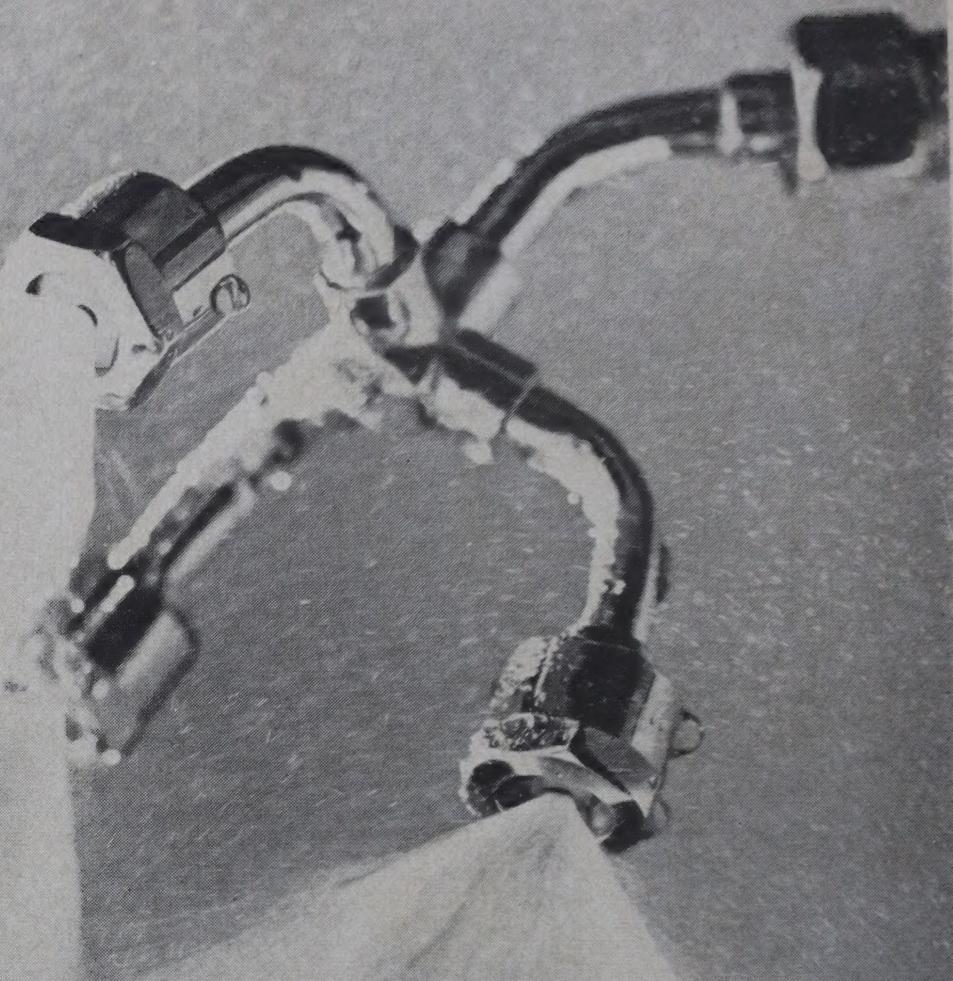
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FOOD MANUFACTURE is sent free of charge to technical executives resident in the United Kingdom and responsible for the direction, operation and maintenance of food production, packaging, quality control and plant, and of research and development in connection with these. To others, and to all readers overseas, it is available on subscription of £10 (\$30) for one year. Single copies £1 (\$3)

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COVER—developments in electronic circuitry play a big part in attainment of higher weighing accuracy, and hence of reduction in product 'give-away' and of higher profits—see article on page 25. Photo shows weighing module of Auto-Tare machine. (By courtesy of Areenco-Alite Ltd)



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The INTERAL biennial exhibition in Paris has become one of the major events in the European food manufacturing calendar. This year's show was held from 13 to 17 November.

This complex of exhibitions is really five exhibitions in one, with separate buildings, each the size of Olympia or bigger, devoted to food machinery, bottling and brewing, meat, packaging, and manufactured foods and beverages of all nations.

For good measure, to provide amusement when the mind (and feet) could not endure any more, there was a small exhibition of promotional gifts. The variety of these was astonishing.

From the technological and processing viewpoints the centre of interest was the MATERAL exhibition of food machinery, and in this section the organisers had introduced a useful novelty. This was an 'international round-up of innovations in food technology', consisting of a stand on which were gathered together the newest machines and processes on show at the exhibition. Selection of exhibits for this stand was made by the exhibition's management committee, who also instituted prizes for the most meritorious exhibits.

The first prize went to Les Micro-Ondes Industrielles division of La Société BEREB for the latest development of their microwave dehydration process, in which the Institut de Recherches Applicable au Boissons collaborated. This development, so far progressed to pilot scale, is known as the continuous Microvac and consists of a stainless steel cylinder 4m long and 0·65m internal diameter, in which is mounted a conveyor band. Two cylindrical 'windows' on top of the main cylinder permit the entry of microwave radiation produced by a 2·5kW generator. The material to be processed, previously concentrated to about 60% solids content by conventional methods, is introduced continuously by means of a dosing pump and deposited on to the conveyor band, which carries it under the 'windows' where it is subjected to the microwaves. Dehydration is assisted by the fact that the interior of the cylinder is kept under vacuum. The dried material is broken up by a scraping device and falls into a bin; an isolation lock enables this to be removed when full without breaking the vacuum in the cylinder. Products for which the process is said to be suitable include coffee extract, milk, sugar syrup, raspberry pulp and fruit juices. Processing time varies from 15 to 60 minutes depending on the product, with final moisture content between 1·5 and 3%. It is claimed that product colour is unaffected and that flavour and aroma are retained.

An interesting friction steriliser for liquids was shown by SEFFAC, consisting of a stainless steel disc electric-

Comment

Innovations at Paris exhibition

ally rotated at up to 5000rpm between two fixed plates, clearance being of the order of 0·3mm. The liquid to be sterilised enters a chamber surrounding the hub of the disc and is drawn off at the periphery after passage of the space between the disc and the fixed plates. In a few hundredths of a second the liquid is subjected to frictional heat which sterilises it. Preheating of the liquid before entry and subsequent cooling are carried out in heat exchangers, and the assembly forms a flash steriliser claimed to allow precise temperature control and to be suitable even for viscous liquids. Capacity of the UF 400 machine marketed by this company is stated to be up to 1500 litres per hour.

Another development which won an innovation prize was a simple but clever method of sterilising cans, so simple, in fact, that one's reaction was: of course, why was it not thought of before! Known as the Hydroflow and shown by F. Hanau SA, it consists of a long tube of rectangular section, convoluted to conserve space, through which cans are flumed in a current of water. In the sterilising section the water is superheated under pressure, while in the cooling section the water is cold. The water therefore performs the multiple functions of heating, cooling and transport. As the cans roll along the horizontal sections of the tube they rotate, the direction of rotation being reversed each time the tube changes direction. It is stated that the speed of rotation thus achieved is greater than with a mechanical system and that the heat transfer into the interior of the cans is therefore superior. The tube is divided into sections, the temperature in each section being automatically controlled by direct steam injection into the tube.

A very neat system of combined mixing and conveying inside flexible pipes was shown by Transilube SA. The heart of the system is a spring steel spiral rotating inside the tube. Two versions exist: the Monospiral, consisting of one spiral rotating between two coaxial tubes, the material being propelled along the annulus following the direction of rotation of the spiral; and the Bispiral, in which the central tube is replaced by a second spiral coaxial with the first and rotating in the opposite

direction. The Bispiral allows a higher capacity for the same pipe diameter while the mixing function is enhanced. An extractor was also shown consisting of parallel rows of rotating spirals mounted inside a trough.

An ultrafiltration plant for whey was shown by Rhone-Poulenc. This consisted of a series of membrane filters mounted in a module, enabling protein, lactose and mineral matter to be filtered out. A scheme for incorporating this filtration system in a dairy plant was presented.

L'Air Liquide showed an interesting method of food freezing with liquid carbon dioxide. The product to be frozen passes on a conveyor under a dispensing device termed a 'Snow-Hood', which produces a mixture of liquid and gaseous carbon dioxide in the form of 'snow'. The gas is separated centrifugally and conducted away from the process environment; the snow is deposited on the conveyor and freezes the product. Snow production starts automatically when a product carton is positioned under the Snow-Hood and actuates contact switches on the conveyor. Although applicable to a wide range of products, this system is stated to be particularly suitable for meat products.

British participation in the series of exhibitions was considerable, some companies exhibiting directly and others through agents. At MATERAL one met familiar companies including Henry Simon, Mather & Platt (who had one of the largest stands), Thorn Automation, and Burgess Engineering who showed a puff pastry continuous laminator. At the exhibition of food and beverage products—SIAL—the British Food Export Council sponsored a joint exhibit of 43 UK companies, the largest number ever to be represented at this exhibition. Of the 30 countries represented, Britain had the second largest site, and certainly one of the best laid out. The stand succeeded in departing from the conventional style of display and comprised open plan stands, one for each company, surrounding a circular area with an information stand manned by the BFEC. This body tells us that France, apart from now being the second largest overseas market for Scotch whisky, is also a good customer for a number of British processed foods. In 1971 the French were the second biggest consumers of British biscuits and cheddar cheese in Europe; surprisingly, it is stated that in the same period Britain exported more cake to France than to anywhere else in the world.

Always one returns from these spectacular and sophisticated European exhibitions depressed that facilities for such shows in Britain do not begin to compare. Bluntly, Earl's Court and Olympia are jokes in comparison with the exhibition parks available overseas.

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Organic waste into protein

The Wolfson Laboratory in Cardiff held a 'briefing meeting' on 25 October to try to interest industrialists in a study of the conversion of organic waste into marketable protein. Participation in the project will cost £1400, and some 70 representatives of food, packaging and chemical companies (including some from overseas) and related organisations took part in the briefing meeting.

The purpose of the study will be to provide detailed guidance to the financial and technical management of companies handling organic wastes on the present and future opportunities for reducing the cost of waste disposal and earning additional revenue through the microbiological conversion of wastes into saleable protein. Its aims are: to provide management, engineers and chemists with a summary of the state of the art and of likely developments; to analyse process conditions and choice of organism for various throughputs and yields; to assess price levels and marketability of the product; to examine the scale of effort needed in terms of technical development, acquisition of skills and plant investment; and to evaluate the financial attractiveness and risk. These aims will be followed in regard to different industries and for all major categories of organic waste.

Planned starting date is January 1973 and completion is expected in nine months. Project leaders will be B. G. Bodroghy of Interplan and Dr Julian Wimpenny of the Wolfson Laboratory, assisted by a staff under the guidance of Professor D. E. Hughes who established the Wolfson Laboratory.

Labelling of food

The Labelling of Food (Amendment) Regulations 1972 were laid before Parliament on 18 October; they make small but important changes to the Labelling of Food Regulations 1970, which come into force on 1 January 1973.

These changes affect the regulations on dry mixes, soft drinks, claims concerning protein, vitamins and minerals, and the names of certain fish.

The principal requirements of the Labelling of Food Regulations 1970 as now amended are defined under five headings: naming of food for retail sale; name and address on label; declaration of ingredients and additives; clarity of labels; and claims.

All prepacked foods for retail sale will have to bear the common or usual name, if one exists (such as 'custard powder') or an 'appropriate designation', which can be chosen by the manufacturer if not already defined under the Act (eg imitation cream) or in compositional regulations (eg pork sausage). Brand names in use for 30 years before

AROUND THE INDUSTRY

4 January 1971 may be used on their own provided the consumers were not misled.

For the first time, many foods when sold non-prepacked will have to have a ticket telling the purchaser what the food is. For fish, also for the first time, specific names are defined to be used on labels.

The labels of all prepacked foods will have to carry the name of the packer, labeller or their principal.

Most prepacked foods will be required to display a complete list of ingredients. The exceptions, limited in number, include biscuits, bread, butter, cheese, certain milk products, coffee, ice cream, flour and confectionery.

Requirements are laid down as to the manner of displaying the required information.

General provisions of the Food and Drugs Act 1955 regarding false and misleading claims are now reinforced by specific requirements concerning the composition of food for which certain claims are made.

Dry mixes will have to be labelled to show clearly if foods other than water have to be added.

Soft drinks are subject to compositional and labelling rules in the Soft Drinks Regulations 1964 (as amended) and need not comply fully with the Labelling Regulations until 5 January 1976. Changes to the amended Soft Drinks Regulations are included in the current amended regulations to facilitate the introduction before 1976 of new labels which would then show a full list of ingredients and a name and address instead of a trade mark.

The amending Regulations (SI 1972 no. 1510) are obtainable from HMSO or through any bookseller price 13p.

Spoilage the menace

Mr Morley Parry said recently that at least half the money spent on food trade cleaning is being wasted by being used in the wrong way. He was speaking at the International Cleaning and Maintenance Conference in London on 28 September, and commented that the real pity was that we had the knowledge, the products, the expertise and the personnel but we did not have the universal realisation that food spoilage costs far more than actual food poisoning.

He said that the greatest problem was that of cleaning food contact surfaces and he suggested that it was inconceivable that anyone but the food handler could tackle that problem. 'It must be an integral part of his own food-handling techniques.'

Referring to regulations that require articles or equipment which come in contact with food to be 'kept clean', Mr Parry said that the products used to clean and prevent the risk of contamination must, *per se*, be sterilants but that they did not necessarily need to produce total sterility on application.

'The best phrase that has ever been used in this connection', he said, 'is that we are searching for a degree of "commercial sterility". A degree of cleanliness, in other words, with no risks for the food trade worker, the food seller or the consumer.'

Attempts by certain people to introduce a set of total bacteriological plate count standards which would arbitrarily decide whether any surface was legally clean or not were dismissed by Mr Parry as pointless. 'The situation will always be that the food handler's efforts to obey regulations will be judged each time on the individual merits of each and every separate case.' Mr Parry concluded by saying that cleaning is not something that has to be done but is the basis of all food trade profits. 'It needs to be as expertly done as all the other food trade crafts.'

Yellow margarine hits S.A. butter sales

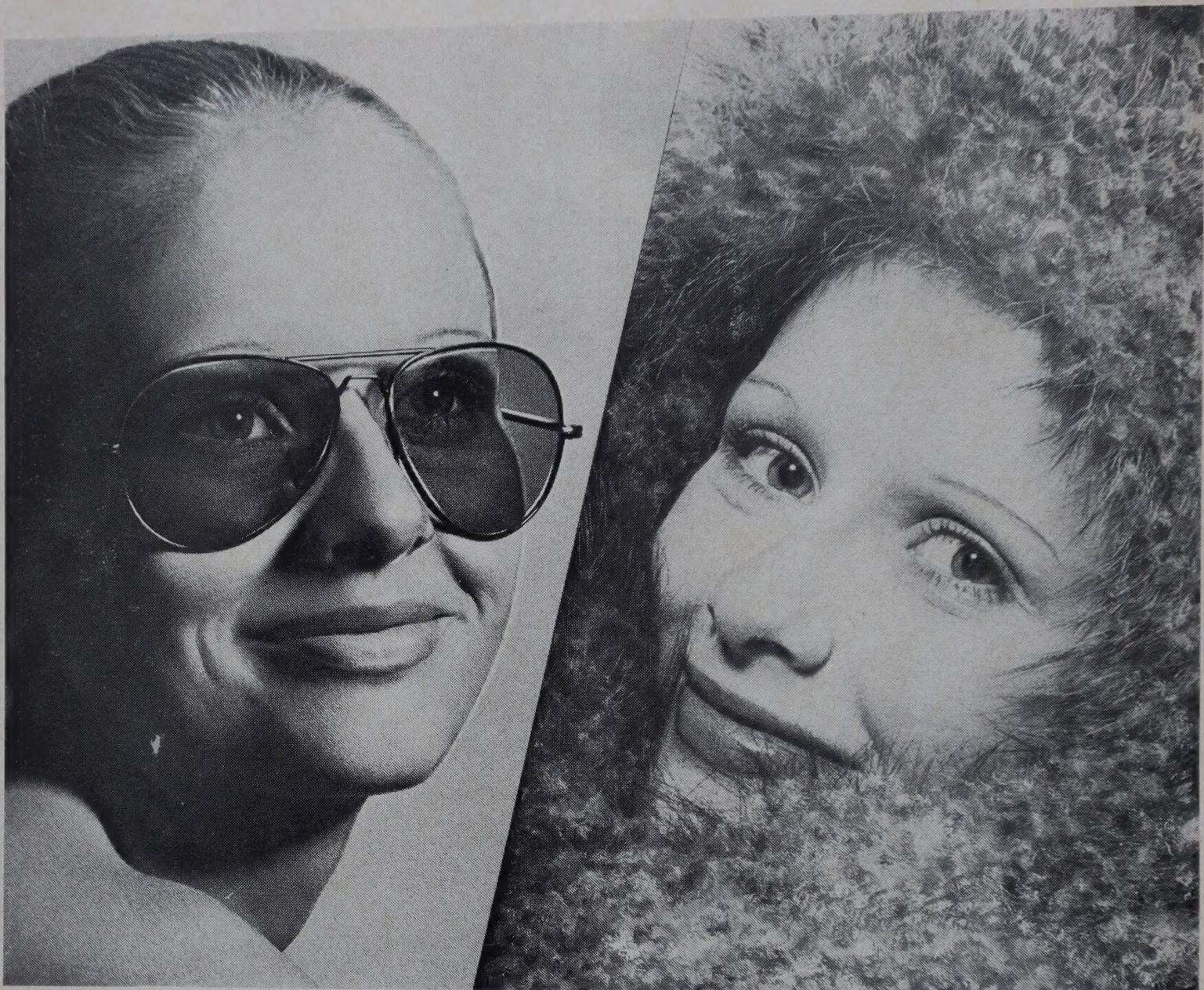
According to our correspondent in South Africa, since legislation was introduced in that country permitting yellow colouring matter to be added to margarine, butter sales have dropped by about 20%. Between 1 October 1971 and 31 May 1972 butter consumption fell by nearly a third compared with the equivalent period a year before. To counteract falling sales the S.A. Dairy Board reduced the price of butter by 20 cents a kg from the beginning of June, resulting in a loss of R4m.

By the end of May, surplus stocks of butter had built up to 14 000 tons compared with 1600 tons at the same time the previous year.

According to a statement attributed to the deputy Minister of Agriculture, the introduction of yellow margarine will result in a complete reorientation of the S.A. dairy industry. The Dairy Board has appointed a committee to study the problem so that the future of the industry can be planned as far as possible.

This year's butter consumption is expected to be of the order of 56 000 tons. From August 1971 to the end of May 1972 17m kg of yellow margarine and 11m kg of white margarine were sold.

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New heavy duty acid cleaner

Pennwalt Chemicals Ltd have introduced Exalt, a new heavy-duty acid cleaner. Supplied as a concentrated liquid miscible with water, Exalt is a blend of acids and wetting agents.

Service in product and process control

AMF Legg of Andover are offering an analysis of customers' control requirements through their control engineering department. This department will put forward recommendations and quotations for supply of control systems.

Food Manufacturers' Federation convention

The 3rd National Convention of the Food Manufacturers' Federation will be held at the Excelsior Hotel, London Airport, on 2 and 3 April 1973, and will conclude with a banquet in the Guildhall, by permission of the Corporation of London.

Wastewater treatment for new factory

A £43 000 effluent treatment plant is to be incorporated by Serck Eftrol into a new factory under construction for Henry Telfer Ltd at Northampton. The contract was placed by Shepherd Engineering Services Ltd of York, who are services contractors for the project. The plant will take a variety of food-processing effluents and remove contaminants, including excess fat, to within the requirements of Northampton Corporation.

Fire prevention for management

The next course in the Fire Prevention for Management series given by the Fire Protection Association will be a five-day residential course at Down Hall, Bishop's Stortford, from 21 to 26 January 1973. The fee for the course will be £69, including full accommodation. Further details are available from the Fire Protection Association, Aldermanry House, Queen St, London EC4N 1TJ.

Grants available for individual capital projects

From January next, organisations and individuals in the UK may apply for grant-aid for physical investment (eg in buildings and equipment) from the Agricultural Fund of the EEC towards the cost of projects promoting the objectives of the common agricultural policy of the Community. Any one wishing to apply or seeking further information should contact the headquarters division of the MAFF dealing with the commodity or service concerned.

NEWS IN BRIEF

New margarine factory

Mr James Prior, the Minister of Agriculture, Fisheries and Food, opened a new £3.5m margarine factory at Purfleet in Essex on 20 October. The facility is an extension of a factory of Van den Berghs and Jurgens, the Unilever subsidiary.

Application for redevelopment rejected

J. Lyons & Co are to appeal against the London Borough of Hammersmith's rejection of their outline planning application for the £17m redevelopment of the 10-acre Cadby Hall site. No reason was given for the rejection of the application which would have consisted of a 1000 bedroom hotel besides flats, offices, a supermarket and various recreational facilities. J. Lyons plan to transfer meat processing to a new £3m factory in Northampton and build an £11m packaged cake factory at Carlton, Yorkshire.

FSC to review milk products

The Food Standards Committee has been asked to review yoghurt, other cultured milks, cream desserts and milk desserts. The committee will be assisted in the review by the Food Additives and Contaminants Committee. The review will be carried out in three stages. The committee will first consider whether regulations are necessary and will pay particular attention to points such as classification of yoghurt according to milk fat content, type and level of fruit and other ingredients added to yoghurt, use of flavourings and additives, description and labelling, and heat treated yoghurt. In the second and third stages the committee will consider whether regulations are necessary for other cultured milks, cream desserts and milk desserts covering composition, description, labelling and advertising.

Interested parties are invited to send their comments to the Secretary, Food Standards Committee, Ministry of Agriculture, Fisheries and Food, Room 548, Great Westminster House, Horseferry Rd, London SW1P 2AE, to arrive not later than 31 January 1973. As the committee will be dealing first with yoghurt, it would be helpful if comments on yoghurt could be submitted as soon as possible and not held up until comments on other products are available.

New detergent

A to Z, a non-caustic powdered detergent for cleaning and degreasing new tanks and machinery, is now available from the Reddish Chemical Company.

Casing available in longer lengths

Viskase's seamless, tubular S Casings are now available in 70ft stirred lengths. This is nearly double the previous 40ft maximum which it was possible to achieve with this casing.

New spray-dried skim milk

Kraft have introduced a continental milk powder which is being manufactured in Norway to their specification. This new spray-dried skim milk is packaged in 25kg bags and unit of sale is one bag.

Gelation and gelling agents

The proceedings of a symposium entitled Gelation and Gelling Agents which was held by BFMIRA in London on 20 October have now been published. This publication, which includes the discussion that followed the papers, is now available to non-members of the BFMIRA at a price of £2.50 per copy.

New range of flavouring ingredients

The Glentham Essence Co Ltd of Rugby Rd, Twickenham, and E. G. Bower Ltd of 29 Ludgate Hill, London EC4, have combined forces in developing and presenting the *Bistro* range of flavouring ingredients. The range consists of imitation smoked ham, roast beef, meat, game, chicken and cheese. Samples, data sheets and other information can be obtained from either of the above companies.

Joint consultative organisation on R & D

The Agricultural Research Council, MAFF and the Department of Agriculture and Fisheries for Scotland have agreed to set up jointly a consultative organisation to advise them on programmes and priorities for government-financed research and development in food and agriculture. The organisation will consist of five boards covering animals; arable crops and forage; horticulture; food safety, nutrition and technology; and engineering and structures. These Boards will advise direct the Council and the Departments. They will be supported by committees which will be responsible for considering in detail research and development within specialised fields. The remit of each Board and Committee will extend from the production of the basic product to the sale of the final product.

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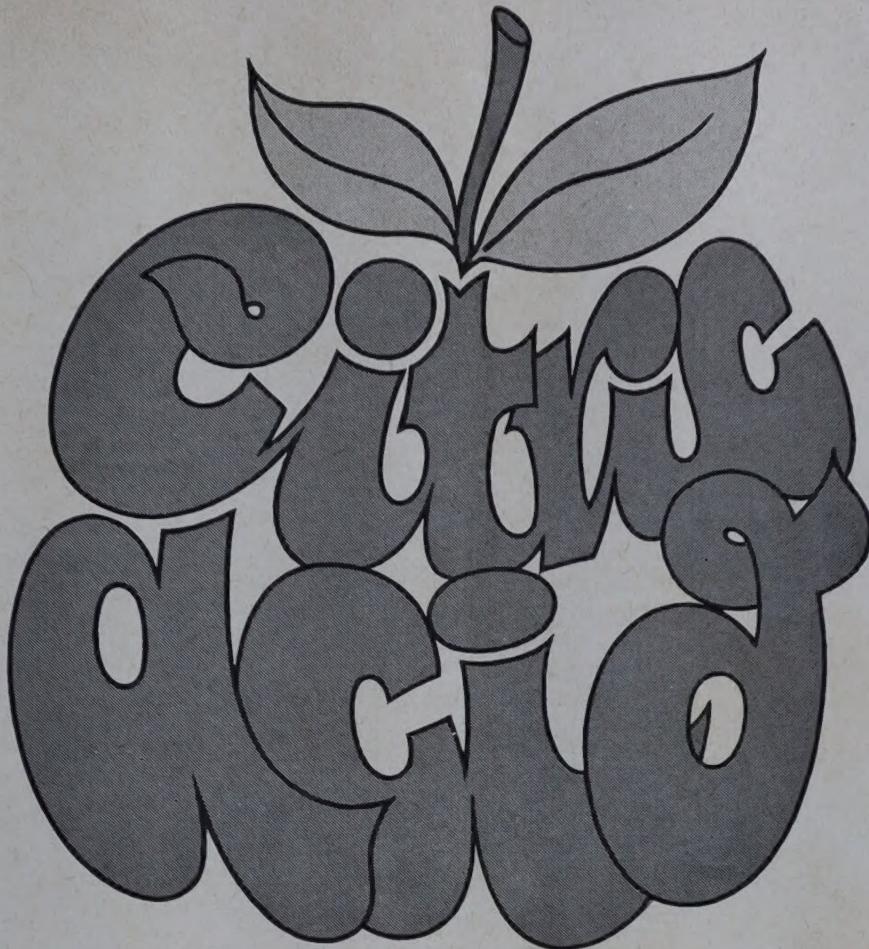
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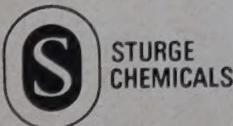


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New croquette production line
A £6500 croquette production line has recently started at the Elmswell, Suffolk, factory of the St Edmunds Bacon Factory Ltd. Capability is 5000 dozen units a week.

Appointment of agents for Danish pumps

Svanehøj Pumpefabrik, Danish manufacturers of centrifugal pumps, are now represented in the UK by Megator Pumps and Compressors Ltd. Megator will handle Svanehøj equipment for both marine and industrial uses.

UK agents for GLC equipment

Precision Sampling Corp, Baton Rouge, USA, have appointed Field Instruments Co Ltd as their sole UK agents. The products which will be available are complementary to their existing lines of gas chromatographs and ancillary related accessories and comprise a wide range of sampling devices.

Farrow's trade mark

Reckitt & Colman and Batchelors Foods Ltd have reached an agreement whereby Batchelors have acquired the exclusive use of the Farrow's trade mark from Reckitt & Colman for UK and overseas. This licence arrangement enables Batchelors to manufacture and market Farrow's canned processed and packet peas as from 6 November 1972.

Expansion in standardised conveyors

As part of the reorganisation of Lamson Engineering, an agreement has been reached with Ryemore (Mechanical Handling) Ltd that as from 1 October all Lamson standard industrial conveyors are being manufactured and marketed by Ryemore (Mechanical Handling) Ltd and all existing stock and spares are being transferred to their works at Colham Mill Rd, West Drayton, Middlesex.

J. Lyons & Co Ltd

J. Lyons & Co Ltd announce that they have acquired for cash the whole of a US\$10m 7% convertible debenture stock being issued by TFI Industries Inc of Chicago. On conversion this would represent about 30% of the equity of TFI.

TFI are engaged in a number of businesses including meat packaging and ice cream franchising, and operate throughout USA.

Lyons have also agreed to purchase the coffee and tea business in UK, USA and Australia of Beech-Nut Inc, a subsidiary of Squibb Corporation. Cash price is about \$55m.

COMPANY NEWS

Psimat Ltd

Psimat Ltd is the new name of Michen Industries Ltd of Henley-on-Thames, who have developed a range of high-pressure cleaning equipment.

New GRP vessel production shop

A.P.V.-Kestner Ltd of Greenhithe, Kent, have now opened a new building for the manufacture of larger GRP storage vessels and process plant.

Associated British Maltsters Ltd

Profit before tax of Associated British Maltsters Ltd for the year ended 31 July 1972 was £2 047 000, compared with £1 530 000 the previous year.

House of MacPherson Ltd

The House of MacPherson Ltd, Chelmsford, have merged operations with those of their associated company, Minister (Soft Drinks) Ltd. As a result, the House of MacPherson Ltd have ceased to trade as a separate company.

New Eden Vale depot

Eden Vale have moved their Alresford depot to Southampton where new purpose-built facilities have been opened. Main features of the site are double cold storage and improved transport arrangements. Volume sales in the Hampshire-Wiltshire area and parts of Surrey have increased 60% in the past two years.

Japanese granulating techniques now available in UK

Russell Finex Ltd have been appointed sole agents in the UK and Europe for advanced types of granulating machinery designed and manufactured by Fuji Paudal Co of Japan. The Xtruder and Marumerizer produce cylindrical and spherical shaped granules respectively. Russell Finex Ltd have test facilities available.

Gardner Merchant Unilever

Gardner Merchant Food Services Ltd and Unilever NV have formed a joint partnership with effect 31 October to establish joint companies in western Europe excluding UK. These companies will provide a catering management, consultancy, advisory or supply service in the industrial and institutional field. The partnership will be known as Gardner Merchant Unilever.

As far as possible the present Unilever production facilities in western Europe will be used by the joint companies, but where appropriate independent production units will be jointly developed.

Adams enter UHT milk market

Adams Foods Ltd have acquired about 30% of the issued share capital of Lloyds Dairies of Cardiff, and intend to make a cash offer for the balance of the share capital. Lloyds have good facilities for the production of UHT milk, it is stated.

Northern Foods Ltd

Following the recent addition of milling, baking and brewing to its milk and financial interests, the Northern Dairies Group is planning to change its name to Northern Foods Ltd. Recent acquisitions involving more than £20m include the Park Cake Co of Oldham, Smiths Flour Mills of Worksop and Hull Brewery.

Factory closure by United Biscuits

United Biscuits are to close one of the factories they acquired as part of the £4m takeover of Cavenham's biscuit manufacturing interests in July. The factory, Wrights at South Shields, is an old one and there is no possibility of it being modernised. Two other factories acquired from Cavenham, Carrs' factory at Carlisle and Kemps' plant at Grimsby, will continue in production.

UK agents for Italian PVC film

Ampaglas SpA, the Italian manufacturers of plastic film, signed an agreement at Pakex '72 giving Roastnet Ltd the exclusive rights to market the Ampaglas range of Ampavinil PVC films throughout the UK. Included in this range are stretch PVC films for wrapping food products, semi-rigid films for over-wrapping boxes and confectionery and shrink films for both food and non-food applications.

Award for export

Libby, McNeill & Libby Ltd have been awarded a second gold medallion for 'outstanding achievement in export field' by the International Export Association. Libby's last won the award in 1970. Of the 5000 UK members of the Association, only 270 have won the gold medallion and only 33 have gained it twice. The award was based on the export record of Libby's during the last two years. To qualify for the award an increase of 40% in exports is required for two years prior to application.

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MANAGEMENT OF DIVERSIFICATION

Frank Broadway

Most established companies find management a relatively easy task so long as they do not embrace change or have it forced upon them. The real tests of management judgment, skill and determination come when, either through growth ambitions or shifts in the market or technology, the company has to venture into unfamiliar territory.

One of the more difficult and hazardous exercises likely to befall most food manufacturing companies is product diversification. The life cycle of most products, in profit terms, is rather depressing. After a relatively brief period of peak profitability, the growth of competition soon turns our 'winners' into bread and butter lines. We can, and should, be engaged in constant and determined endeavour to resist the erosion of the profitability of our existing product spectrum by increasing efficiency in production, marketing and distribution, but there are limits to these processes. In most fields, if we stay for too long with the same old products, we are condemning ourselves to declining profits.

Most companies initially react to this situation by looking for new variants within their current product and marketing field. This is a sensible approach, but it carries dangers. The advantage is that a minor variant on an existing product does not involve any substantial changes in technology or marketing. The danger is that new variants will simply fragment sales over a greater variety of lines without significantly adding to overall volume, with adverse effects on costs and profitability.

Even if, however, it proves possible to take more business off competitors than off one's own established lines, the potential is usually limited. Competitors have a nasty habit of hitting back, either with their own new flavours, or with price reductions, or with intensified marketing effort, but this is only part of the problem.

What basically prompts most companies into diversification is the slow growth of most market sectors in the British food trade. Once a company has pushed its attempts to enlarge its market share in its own sector to the point of diminishing returns, the attractions of trying one's luck in a new market sector become very strong, especially if there are substantial growth ambitions.

Major product diversification is a serious matter, and it should not be

embarked on without a good deal of investigation and calculation. Part of the investigation should be a consideration of the alternatives. One alternative is geographical diversification, either through direct exports or overseas subsidiaries. In some companies, ruthless variety reduction, combined with rationalisation of production, marketing and distribution, would produce a better profitability payoff, with less risk, than would be likely from product diversification.

Getting new ideas

Once management is satisfied that product diversification is its best course, the first problem is obviously to decide the new field of operation. In large companies there is often an embarrassing profusion of alternatives, with new lines from the research department and licensing and takeover possibilities to be considered. In smaller companies the embarrassment is often a paucity of ideas on new product possibilities which could be pursued within the limits of the company's resources.

One way to avoid these problems is to foresee the need to diversify well in advance. This enables top management to lay down guidelines on the kind of diversification projects it wants to consider. Once this has been done, market research studies can be commissioned, acquisition and licensing prospects can be screened, and technical development can be concentrated on new product areas which fall within the guidelines. Regular reading of the trade and technical press will usually remedy any shortage of ideas, while plenty of companies derive inspiration for product diversification by sending executives to the more sophisticated overseas markets to see 'what's new'.

What most companies look for in product diversification is something which will take them far enough away from their existing market sectors to avoid their growth limitations, but not so far away as to require massive new resources of expertise, staff and equipment. The ideal is a new product which can be made with existing plant and production staff, sold by the present sales team and distributed through the present transport network. This is usually too much to hope for, and most companies accept the need for some new plant and some unfamiliar technology, providing the sales and distribution operations will not differ

in kind from those already undertaken.

Criteria to be applied

There are various other criteria management will want to impose. The new market sector should be a genuine growth field. It should not be too bitterly competitive. The new entrant company should have some 'plusses' to offer, through improved products or new marketing ideas or cost and price advantages. The new product should be capable of development into a 'family' of lines, otherwise the same factors which made this diversification necessary will soon be operating again. The 'entry fee', in terms of fixed capital involvement and marketing investment, must obviously be within the company's capacity to afford. A good principle is that no project should be embarked on which is so large, in relation to the company's total resources, that irreparable damage will follow if it fails.

Ideal projects are inevitably hard to find, and most diversifiers eventually have to compromise in one way or another. The compromise is often along the path of least risk. This is prudent, but it often means very modest rewards. It can also lead to actual failure of the project because timidity tends to produce commitment on a 'too little, too late' basis which gives competitors every chance to establish themselves.

The best compromise decision is usually to embark, other things being equal, on whichever project offers the best chance of exploiting the company's distinctive strengths. Most established businesses have some area of flair or special expertise. It may be in marketing or cost control or some field of technology or in running a complex distribution operation. Whatever it may be, the best new project for the company is something which gives full scope to this skill or flair.

Investigating the 'what' of diversification inevitably prompts consideration of the 'how'. One of the crucial decisions is whether to diversify by acquisition of another company, through a joint venture, or by building up one's own operation from scratch. Acquisition is usually regarded as the least risky route. The acquired company will have a track record on which some predictions about the future course of events can be based. Whereas a greenfield venture adds to total com-

petition in the chosen market, diversification by acquisition does not, and it gives the acquiring company an immediate market share which might otherwise take years to build up.

Against these considerable advantages must be set the fact that acquisition is often a very expensive route. If the coveted company is successful, the price is likely to be high—perhaps high enough to dilute the profits of the new parent for several years. In addition, potential acquisitions rarely operate neatly only in the field the acquirer wants to enter. They often bring with them a ragbag of other interests, some unsuccessful and some possibly competitive, leaving the acquirer with a difficult rationalisation job.

Joint ventures share the risks between the partner companies, but their main rationale is usually to provide an all-round range of skills which neither partner could singly offer. Sometimes one partner supplies technology and the other a marketing organisation. In some cases a joint venture is the price for a licensing agreement from an overseas company.

Why some ventures fail

Before ruling out acquisitions or joint ventures, the diversifying company should consider in detail how it would proceed with a greenfield opera-

tion. Apart from the obvious questions about how it would make, market and distribute the products, it needs to take a view on who would manage the operation. Many diversification ventures fail because they are not given sufficiently single-minded management. Unless the venture is very small, it is a mistake to distribute bits of the operation among existing managers as an extra chore. Another common mistake is to appoint a general manager for the new project who is manifestly junior to colleagues looking after existing products. This is a good way of ensuring that the new project always gets low priority. Once the decision to diversify has been taken, it should be backed with a management structure which ensures that the project proceeds with urgency.

It should also, of course, be backed with all the resources of technology, engineering, marketing and personnel needed to give good prospects of success. The scale of entry must obviously depend on the company's resources, but a good deal also depends on timing. If the company is early into its new field, it can usually afford to start on a small scale and work up. This is normally the least risky way of proceeding with a new venture and it is, of course, one reason for planning well ahead for diversification. The

latecomer to the market usually faces plenty of established competition, and acquisition or very heavy marketing spending may be necessary to acquire a significant market share in a reasonable period of time, unless the newcomer has some product 'plusses' up his sleeve.

It is, of course, possible to come a cropper on diversification through being over-ambitious, but timidity is probably a more frequent cause of failure. In the food trade, every innovation is closely studied by competitors, and if it looks promising they are soon hard at work developing their own 'leapfrogging' brands. If the pioneer is hesitant in following up an initial success, he may soon find himself overtaken by bolder spirits and relegated to a minor share of the market he first created. This kind of situation is best prevented by having a suitably ambitious 'Phase two' plan ready to swing into action if the initial operation fulfils expectations.

Successful diversification can give a dramatic new lease of life to a static or declining company, but a failure costs a lot of money and gives a terrible setback to morale. Most companies must sooner or later diversify. The attempt should not be allowed to fail through lack of management forethought, skill, or determination.

RECENT PATENTS

Heat treatment under pressure

Alfa-Laval Aktiebolag of Sweden have recently patented an invention relating to the heat treatment of food products by an electromagnetic or acoustic field (UK Patent no. 1269606). The invention seeks to prevent the packaging around the products 4 bursting as a result of the increased vapour pressure caused by the heating. The method involves placing the products in a container 1 and surrounding them wholly or partially by a liquid before hermetically closing the container by an end wall 2. Alternatively the liquid may be inserted, after closing the wall, through an opening 7. The container is then moved through the electromagnetic or acoustic field so that the products are rapidly heated, the vapour pressure within the packages being counteracted by the pressure of the liquid which may be partly vaporised. After the heat treatment a cooling medium is introduced through opening 7 and maintained at a predetermined pressure until the products are cool enough to eliminate the risk to the packaging, after which the pressure is increased

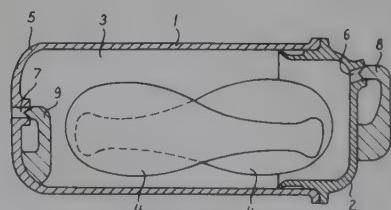
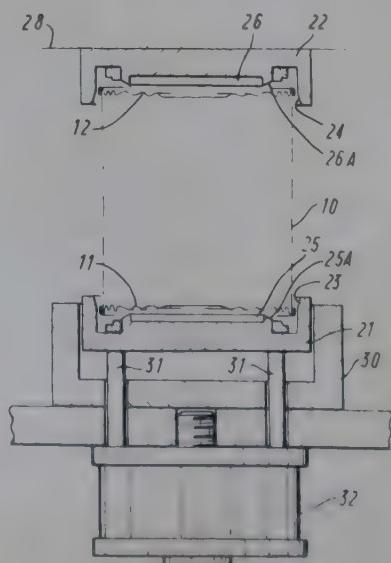


Fig. 1 (above)

Fig. 2 (below)



to overcome the strength of valve 8 and the cooling medium leaves the container through opening 6 (Fig. 1).

Stops cans collapsing

The problems of collapse etc associated with a vacuum remaining in a can after sterilising have been sought to be overcome by a process patented by Etablissements J. J. Carnaud & Forges de Basse-Indre of France (UK Patent no. 1235060). The process allows sealing of the cans at 100°C, or above, with the subsequent sterilising at a high temperature, and while the cans are then being cooled, reducing the internal volume by the permanent deformation of either or both ends using a mechanical press thereby resulting in a reduction or elimination of the vacuum generated by the cooling action.

The press comprises centring members 21, 22 with lead-in tapers 23, 24, and punch elements 25, 26 having annular pressure-applying faces 25A, 26A. A pressure limiting device 32 is set to a value determined by the bursting strength of the cans (Fig. 2).

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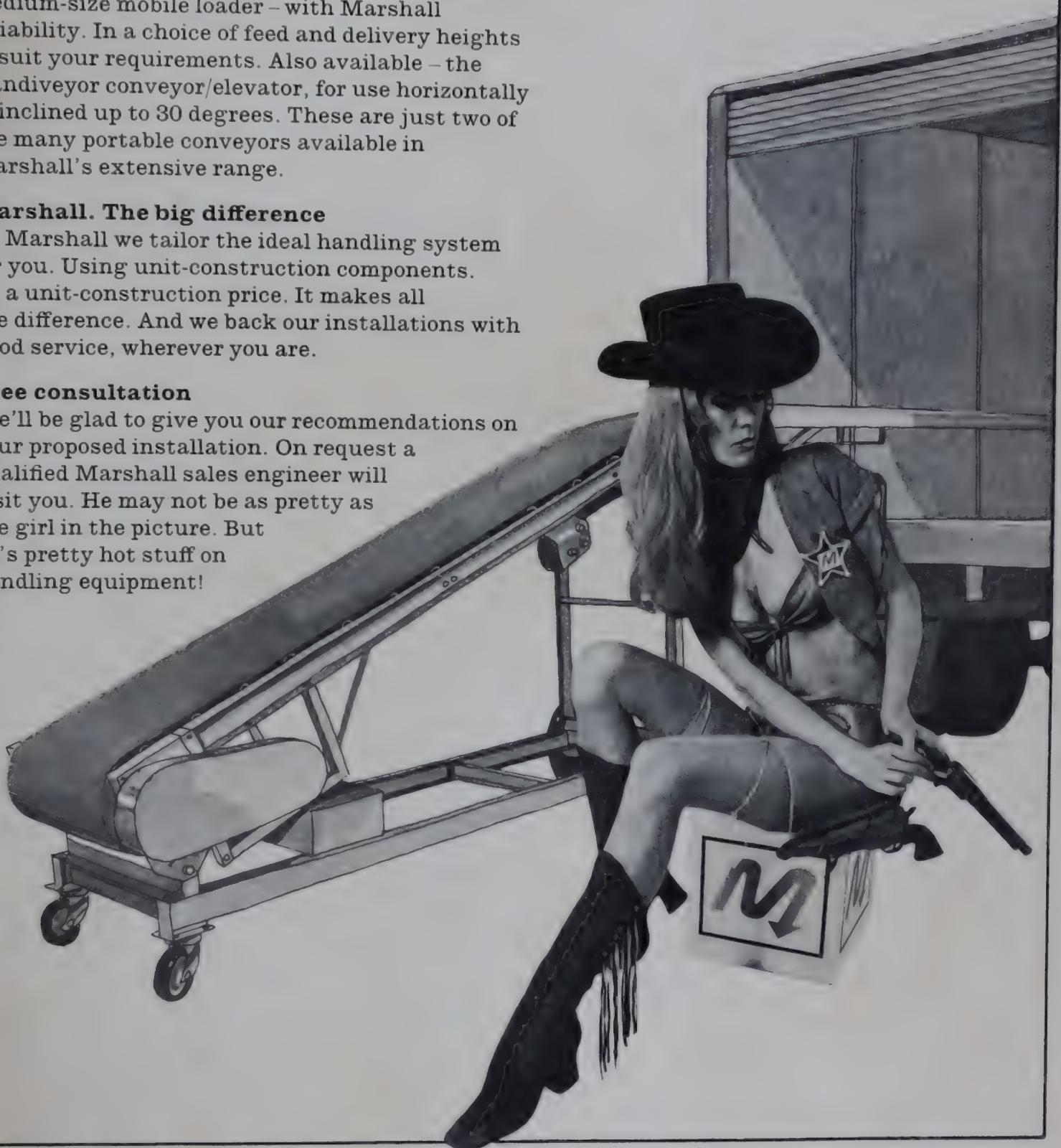
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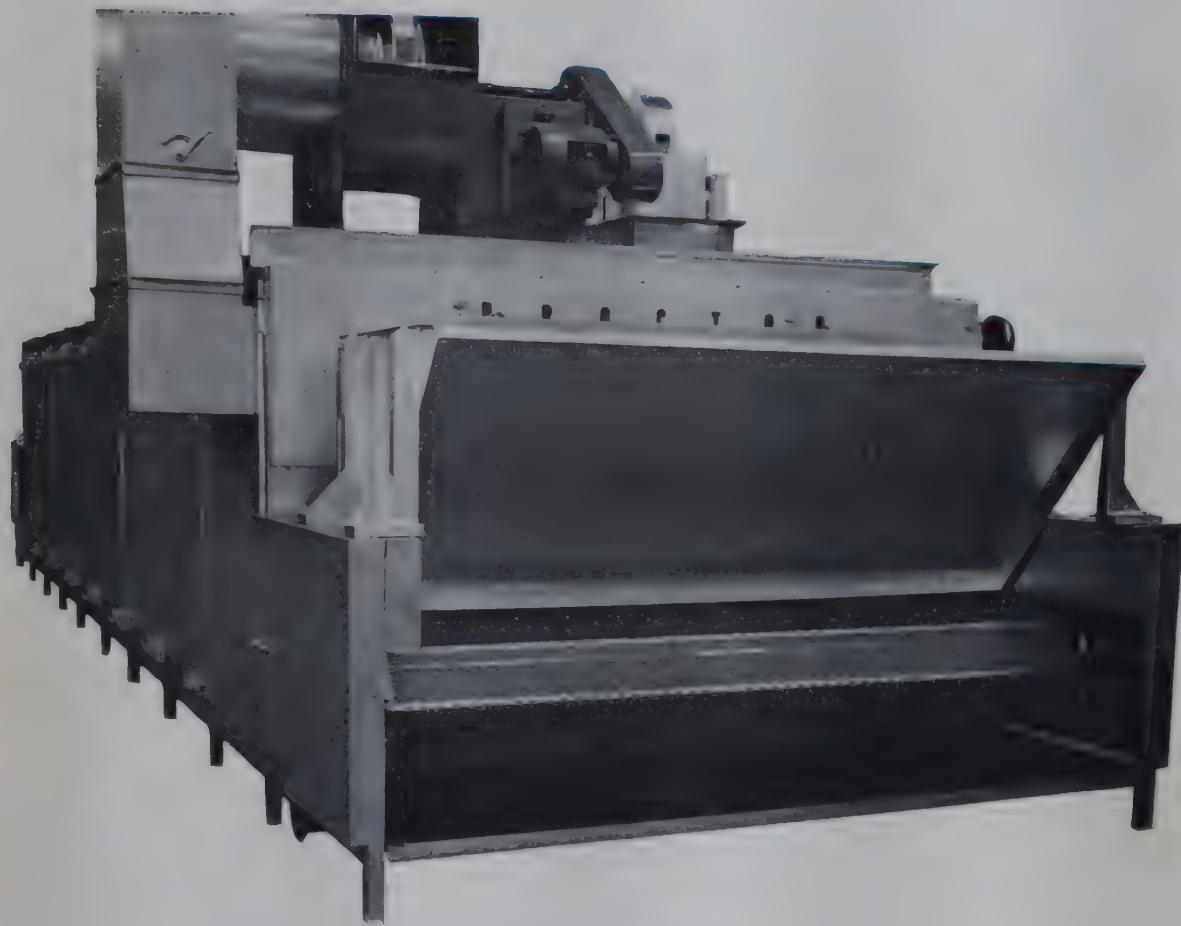
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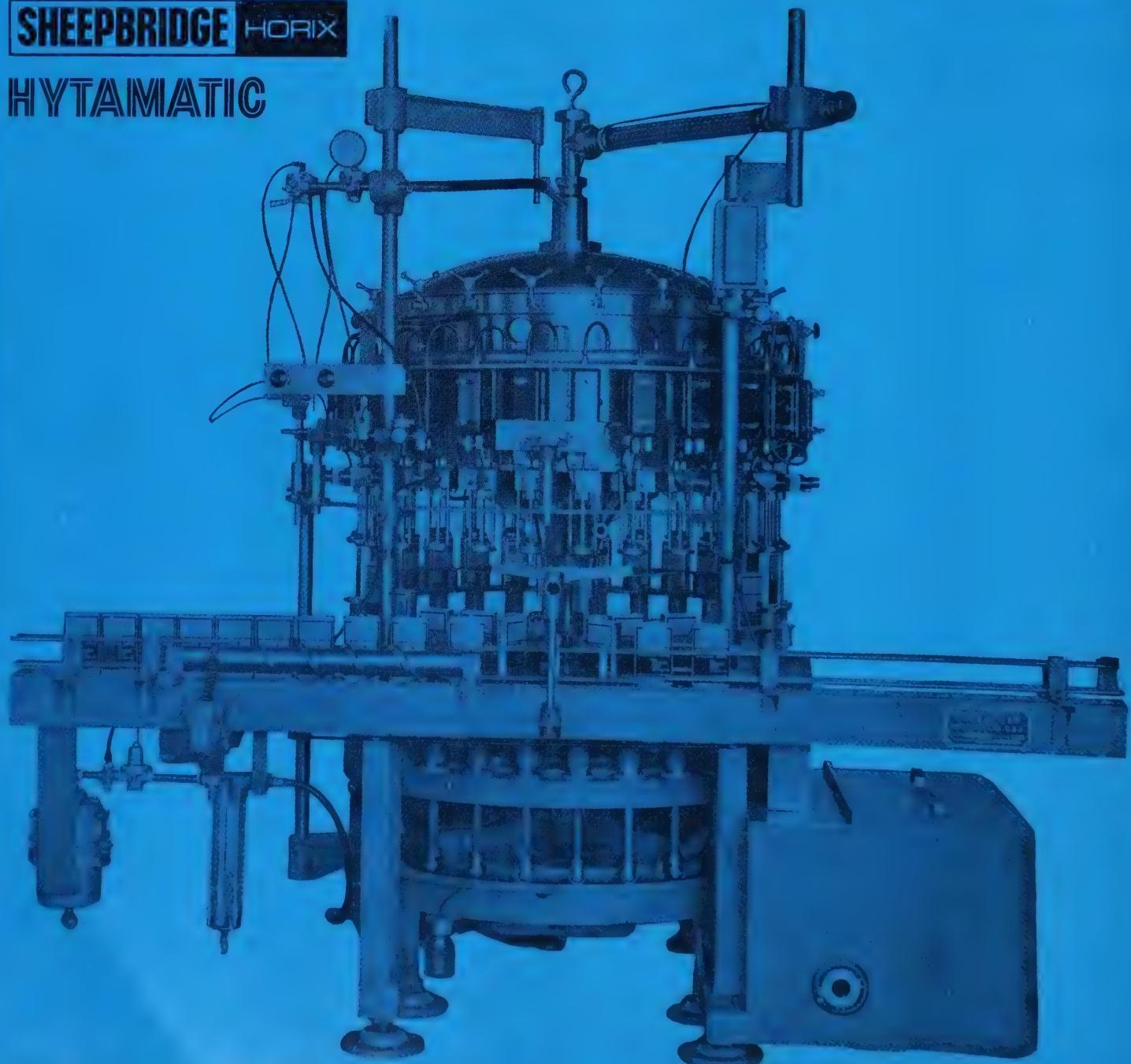
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HANDLING DIFFICULT PRODUCTS

J. A. Truman

Technical Manager, Driver Southall Ltd

Handling food products is, of all packaging problems, one of the most important and sometimes the most difficult. The types of product encountered are legion, and within the industry development engineers have evolved a particular expertise in handling difficult products with which they are familiar. Naturally, the expertise is scattered and whilst trouble shooting will always be a matter of 'each to his own' in the industry, the following general observations may serve to stimulate engineering minds confronted by typical problems.

Liquids, semi-liquids and pastes

Hydraulic machinery is considered usually for handling liquid, semi-liquid and paste products, and the accepted practice is to try to pump the materials in bulk from one position to another. Probably the most serious consideration is the effect of pressure on the product and whether there is likely to be any breaking down of the component parts of the mixture, paste or fluid.

For liquids or semi-liquids carrying lumpy articles there is a range of equipment available for pumping and transferring the material. Often the selection of pumping equipment and storage vessels is determined by the particular characteristics of the product to be handled, especially since particles contained within the fluid may be partially separated or gathered together.

Powders and powdery products

With powders and associated products each material again must be considered individually because selection of equipment will depend on the composition of the product and the effect of pressure handling on the material. More often than not, such materials contain sugar which will glaze transmission systems or fat which will build up on the transportation devices.

These types of material usually tend to 'bridge' in hopper work and the product may need to be induced to flow efficiently by feed systems. Such materials can be fed through bulk transfer systems using air blowers, scraping-type conveyors or auger-type conveyors, though the latter may have a tendency to build up on the flutes of the auger with sugar or fatty products.

Vibratory feed equipment can be

used to distribute the material from bulk hoppers, but invariably the hoppers will require a certain degree of rotary or similar agitation to prevent the material from bridging. Vibratory equipment working in conjunction with level detection probes can be employed usefully as there are a wide range of vibratory units which are totally enclosed and which can be vibrated at varying amplitudes and frequencies and, if necessary, to provide sieving or cleaning operations. Some auger units working in conjunction with probe detection can feed materials of a powdery nature effectively from bulk hoppers into other equipment, particularly where a constant head of material is required.

With large auger feed units similar reasoning applies to ensure that they are protected from the build-up of sugary products and fatty substance, and that the pressure involved does not damage the material being handled.

Free-flowing granular-type products

Granular-type products are easy to handle and the handling problem is not that of the ability to feed but of controlling the feeds. Usually the products flow freely under gravity and the engineering or packaging processes require a controlled rate of feed to a particular operation. Generally, the appropriate control systems do not damage the product as they are fairly gentle in operation and typical arrangements are vibratory feed systems as described above or even simple flow valves.

Where precision is required it is possible to pass such materials over weight measuring systems, so that feed from bulk can be regulated to provide a constant weight throughput. Often referred to as constant weight feeders, the systems can be applied to products other than free-flowing granulars.

Large piece materials

Large piece products embody a variety of large and small sizes. In this case, there is a tendency to separate and a vibratory feed system must be considered only if it is known that separation of the items can be corrected later in the process. When the large pieces are of more regular size, vibratory feed equipment is one of the better ways of handling the product.

Special considerations

There are some well-known problems in materials handling where the choice of hopper material can have a marked effect on the efficiency of feed (eg fine powders that build up and bridge within chutes and hoppers).

In handling powders, the problems of aerating the products when they are transferred by air have to be considered; often it is necessary to remove the air before the products can be fed to a packaging process. There are methods of inserting porous materials into the powders and extracting trapped air but, ideally, the feed system from bulk should be considered initially such that any unwanted air does not get into the product.

Most engineers will know of the various surface finishes which can be applied to hoppers and feed trays, particularly on vibratory units, to prevent sticking of materials and to induce a desirable flow. Even with granular materials it is often desirable to ensure that surface markings on the hopper material are in the direction of product flow. In the case of handling frozen foods or products there are a range of materials specially suited to the non-adhesion of ice and it is possible to use laminated linings or porous materials which allow air to be blown beneath any build-up accumulating on the walls of the hopper or feed units.

Different products present different problems as typified by the feed systems for handling products such as long, thin sticks of spaghetti which require special treatment to prevent breakage, whilst retaining a regular feed.

With cake mixes the fat content must be kept in manageable form until it reaches the final pack, while various other techniques have been used like mixing ground 'dry ice' with the product so that it is manageable until the final pack stage.

When sticky products have to be considered, such as dried fruit, glacé cherries, candied peel, soft brown sugars etc, vibrating equipment may work to a large degree, but a range of coatings and finishes for the feed trays must be considered for each item and sometimes it is necessary again to add some material or compound to the product which will not interfere with its qualities in any way but will make it more manageable.

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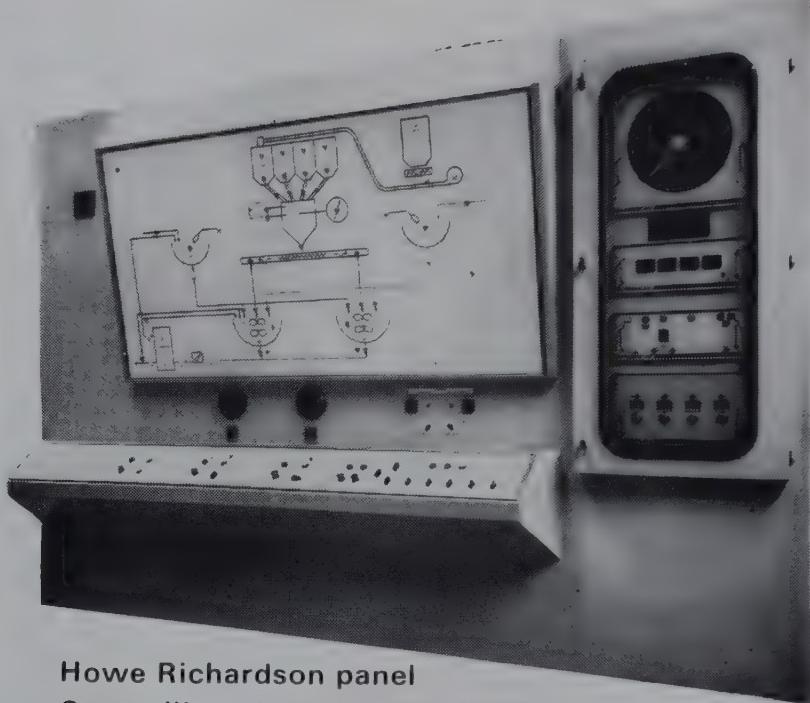
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HIGHER ACCURACY IN WEIGHING

S. L. Austin

Arenco-Alite Ltd

Legislation and the high cost of product 'give-away' combine to produce a need for higher accuracy in weigh-filling. Machinery firms have responded by developing new machines typified by the systems described here

Advances in techniques cover many aspects of filling, including the attainment of higher accuracies. The incentives for greater accuracies are self-evident, stemming as they do from the weights and measures regulations, and from the high cost involved in excessive product 'give-away' which, of course, differs from company to company and product to product. Obviously the more expensive the product the greater the cost; and therefore the greater incentive to reduce the amount which is given away to ensure that no underweights are passed.

Weigh filling is the solution to most problems concerned with product 'give-away' and falls into two categories, 'gross weight' and 'net weight'.

Gross weight filling

Gross weight filling is simpler to accomplish and therefore cheaper to install, but is reliable only for constant weight containers such as bags and some types of cartons and plastic containers. Where a variation of substantial magnitude is present, as in metal or glass containers, this method is generally not acceptable.

If this method of filling is utilised, the target weight must be set at a level sufficiently high above the net weight to allow for maximum container variation and the inaccuracy of the filling method used. For example, if the container weight variation is 20g and the accuracy obtainable by the filling method is a 5g spread, the target weight must be set at least 25g above the net weight required. For a fill weight of 200g this represents a 12½% 'give-away'.

It is possible to reduce the target weight required by container selection, but this involves either more expensive containers or additional operations to select and control the presentation of containers. It also requires changes to the filling weight to compensate for differing container weights within the bands selected. For example, if the container variation is known to be 20g maximum, by careful selection four

bands of weights could be achieved; the variation in any would only need to be 5g and the target weight would only need to compensate for 10g. (The variation in the container weight band plus the accuracy limits of the filling method.)

This method would require the addition or subtraction of weights to compensate for lighter or heavier containers. It is not advocated as a desirable method of achieving a required result as it would be difficult to operate.

Net weight filling

Net weight filling is the most satisfactory method of reducing product 'give-away' and even though it involves a high initial cost will show a profit for many products. As the variation in container weight can be compensated automatically, the amount of product 'give-away' can be limited to the accuracy of the filling method employed.

To achieve any net weight fill, it is first necessary to find the tare weight of the empty container, then to store this information until required. This can be made applicable to several methods of operation, each having its own particular merit, and as no precise data are available it is difficult to compare method for method. What is known, however, is that the results obtained are better than those achieved for gross weighing when applied to variable weight containers.

It is possible to achieve net weight results by first weighing the container, passing it to the filling station and dispensing volumetrically the amount required, then re-weighing the container and automatically deducting the tare weight. If the container plus product minus the tare weight of the container is within the acceptance band set for the checkweigh facility, the container is allowed to pass. If it is not within the acceptance band it is rejected.

Two considerations must be made

with this system. The output required decides the speed at which the product is dispensed. This has a direct bearing on the accuracy obtainable. The other consideration is the variation in bulk density which also has a bearing on the obtainable accuracy.

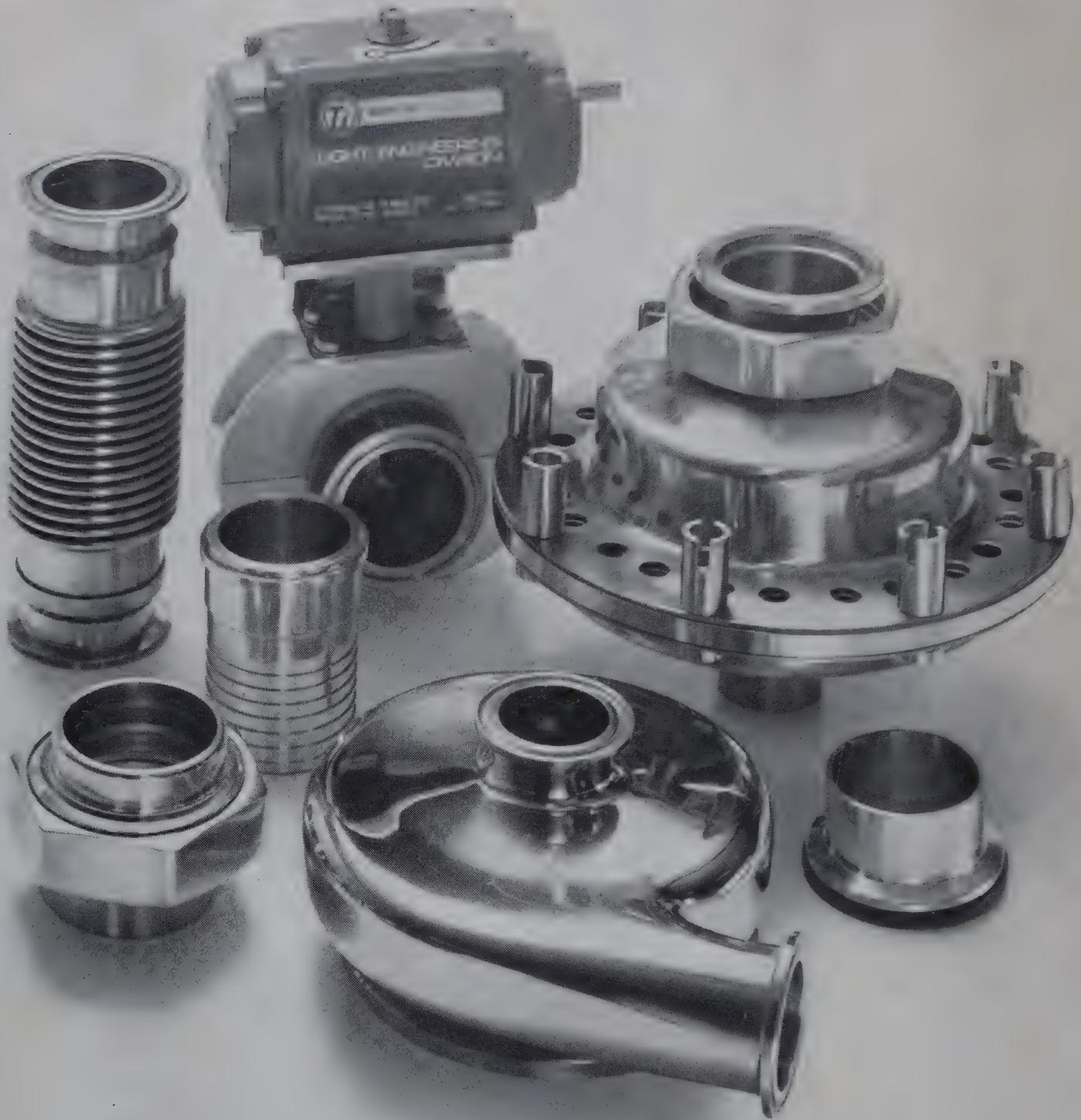
Both considerations will influence the number of rejects produced, but for constant weight products the method is a viable proposition, subject to the limitations imposed by output requirements. To overcome bulk density changes it is possible to incorporate a facility known as trend control, which compensates automatically if a given number of rejects are all heavy or all light. The adjustment is made in stages to avoid overcompensation and excessive reject rates.

Another method used to produce acceptable results utilises a volumetric fill subsequent to the tare weigh stations. At the first set of filling stations a bulk fill is made, which is below the required net weight, and at the second set of filling stations the container is weighed and topped up by an auger which rotates for a given number of revolutions, determined by the check weigher. Rejects can be decided by the checkweigh facility, and trend control used to adjust the bulk fill to compensate for bulk density changes. If this method is used with rotary cup fillers the trend control automatically adjusts all the bulk fill stations together.

These are not normally independently adjustable. The top-up stations' accuracies are subject to bulk density changes over the whole of their dispensation period and are also subject to the inefficiencies of the auger feed. No compensation is possible for the inaccuracies which occur due to these two anomalies.

A recent system

One of the latest methods utilised in the field of net weight filling is the system produced by Hunting Engineers Ltd designated 'Autotare'. This system



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TI STAINLESS TUBES

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can be incorporated into machines which dispense products into rigid or semi-rigid containers. It is, of course, intended for use with variable weight containers and has been used successfully for product weights from a few g up to 25kg.

As with all filling methods employed to handle powders and granules, the accuracy is governed by the throughput required and bulk density changes. Of these two limitations the most significant effect is usually the output required, as bulk density affects only the amount of product in suspension when the cut-off signal is given. Normally the proportion of error due to the electronics is insignificant.

A facility for which provision is made is the inclusion of an additional switching circuit to provide an automatic speed change or trickle feed. If related to auger fillers it can be used to change the output of the auger and under some circumstances may be an advantage. The limit of this facility's success is that the auger size remains the same and, to achieve a useful output from the machine, the largest auger possible compatible with the required accuracy must be used. Therefore the trickle feed loses some accuracy advantage due to the size of the auger and, of course, a slightly lower output is achieved.

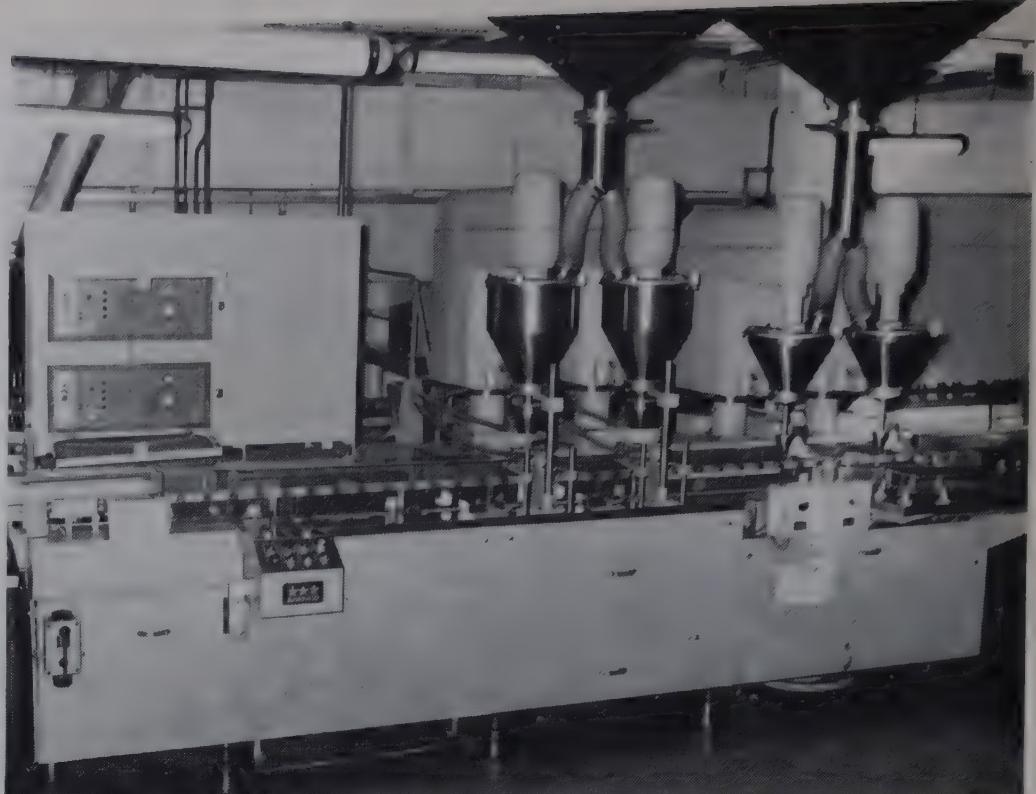
The system utilises a controller, a spring and flexure weigh cell, and bistable latching relays. It is ideally suited to the semi-automatic net weigh filling operation of products such as instant coffee.

By providing a switching circuit, the same weigh cell can be used to gross-fill weights seven to eight times the rated capacity of the cell as an auto-tare device. Thus a 1lb cell utilised as an auto-tare device may handle 7 to 8lb as a gross weight filling machine. The accuracy obtainable would be proportional to the weights handled and output required.

Due to the vast number of products marketed and their diverse handling characteristics, it is not possible to state categorically what accuracies would be achieved, but for most products a figure of $\pm \frac{1}{2}\%$ could be realised, ie for a 200g full weight a target weight of 202g could be set.

The system could be incorporated into a fully automatic machine, but the combination of accuracy requirements, container stability and manufacturing tolerances, and the fact that all the operations required (ie centralisation of container under the filling station, delay for weight signal stabilisation, filling time and checkweigh) are performed at the same station, limit the output.

For automatic precision filling at speeds up to 75 containers per minute



Arenco-Alite model PFU/10/TC precision filling machine fitted with LF.8 filling heads incorporating gas flushing facility. Suitable for freeze-dried and instant coffee.

a number of machine types can be provided. The single system range provides facilities for the gross weight filling of bags, cartons and plastic containers. In these systems, the variation in container tare weight is ignored, as the machines are intended for constant weight containers (a semi-automatic version is also available).

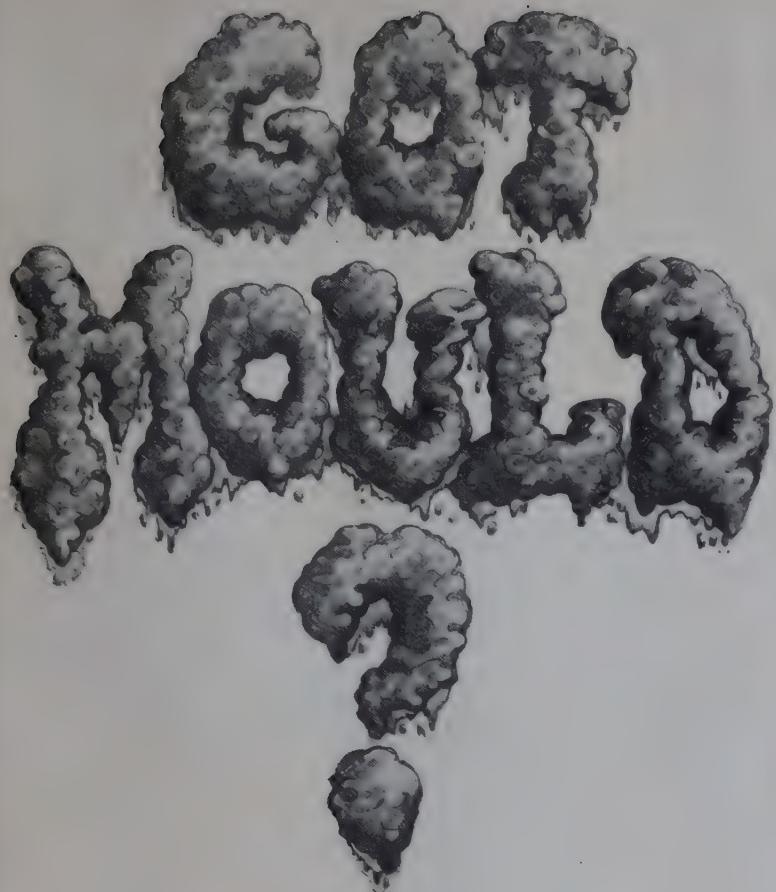
The containers are fed into the machine by an infeed conveyor and are pushed into the pockets of a 'cake-walk' device (this device operates on the walking beam principle) which transfers them to the filling point one at a time. At the first stage filling position approx. 90 to 95% of the weight required is dispensed into the container, this is predetermined and controlled by a timer. When this has been completed the container is moved in stages to the next filling station, designated 'Top up'. A weigh cell is sited beneath the filling point, and at this position the container must be completely free standing and situated on the weigh platform. The weigh cell checks the gross weight of container and product to ascertain that their combined weights are within the acceptance band. If too much product has been dispensed at the first stage no 'top up' will take place, if too little was dispensed the machine will not complete its filling cycle. In either case these containers will be rejected as overweight or underweight. The reason for overweight and underweight rejects is the changes which occur in bulk density. Since the 'top up' fill is between 5 and 10% of the 'bulk fill' weight, a change of 10% in bulk density allows insufficient cor-

rection to be made by the 'top up' stage.

To overcome the problem of bulk density changes, trend control is available. Although the system can function without the trend control, it is considered desirable for most products. The trend control operates over a range of approx. 30% change in bulk density. To avoid an excessive number of rejects, it adjusts the bulk fill in stages which are determined by the 'Plug in' trend circuit boards, these being determined by the maximum variation in bulk density calculated prior to the installation of the machine. In practice they can be readily changed for different conditions. The trend control does not make adjustments to the bulk fill unless a specified number of containers are rejected for the same reason, all overweight or all underweight.

Variable tare weights

A more sophisticated system is available for the net weight filling of variable tare weight containers such as cans and glass jars. This system employs a similar principle, but incorporates additional electronic equipment including a weigh cell prior to the bulk fill station. This converts the weight of the container to an electric signal and passes it to a memory store, where it is held pending its use at the 'top up' stage. When the container reaches the 'top up' station, the stored tare weight is deducted from the combined container and product weight and the machine makes a decision to dispense product or not, as required.



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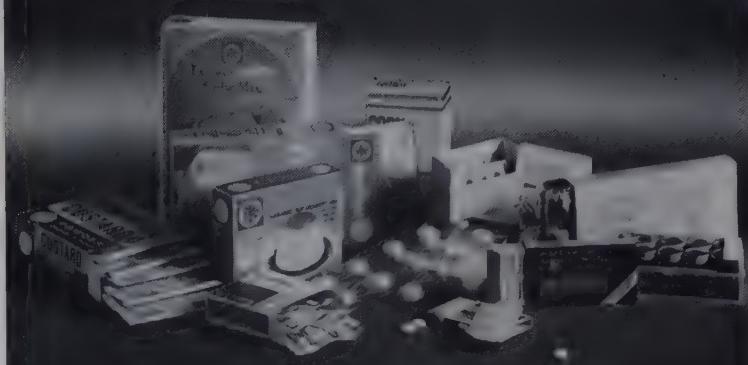


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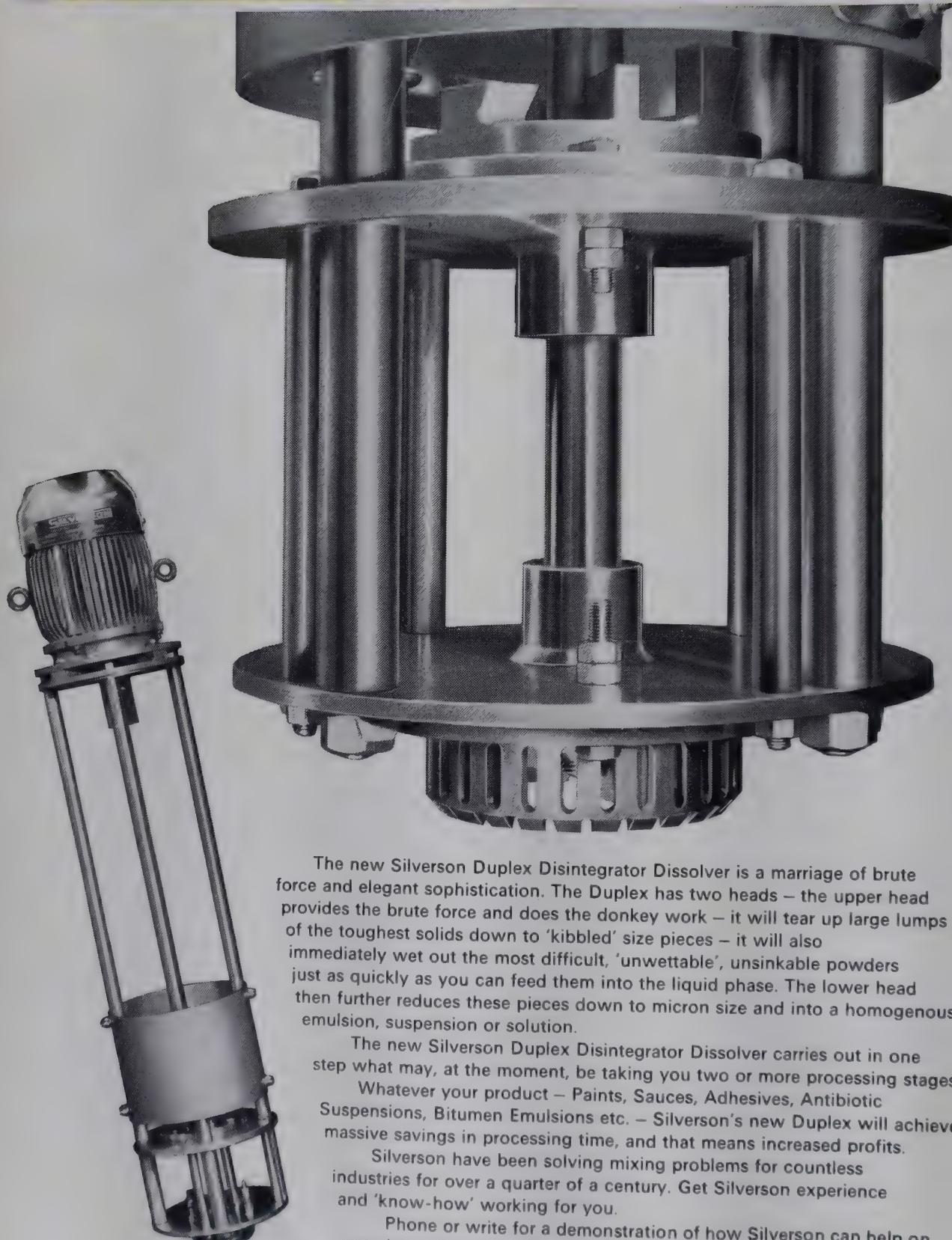


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There are two systems which can be employed for either gross weight or net weight filling. The first, known as a sequential system, rejects filled containers if two alternative conditions prevail:

1. If no product is dispensed at the 'top up' stage, this condition is recognised by the weigh cell as being too close to the limit for a satisfactory result to be achieved by the 'top up'.
2. The other and opposite condition applies of there is insufficient time for 'top up' to complete its function.

The first condition would be recognised by the trend control as an overweight, and the second as an underweight. In conjunction with the preceding and following container weights this would form a pattern which the trend control would act upon. It is also possible to build into the electronic system a facility to accept overweights up to a certain level and reject only the underweight filled containers. This system provides a constant output machine.

The second system is similar in

principle but checkweighs each container before and after 'top up' filling. It can therefore provide a constant speed machine or, if the facility is built in, a machine which would enable all containers below the bulk fill high level limit to be 'topped up'. Due to its method of operation this system is slower than the sequential type. An overweight switching circuit can be incorporated to allow corrected overweights to pass but reject underweights. Trend control is also required as a part of the function of this system as indeed it should be to any precision filling system employed in the filling of powders and granules.

The advantages accrue from the 'bulk fill' stations and small accurate dosing at the 'top up' stations. If auger fillers are used each is independently adjustable. The only significant inaccuracies occur due to the changes in bulk density and slight variations in the 'top up' auger outputs.

These variables affect only the amount of product in suspension at

the time of 'cut-off'.

Accuracies can be quoted for instant coffee as follows:

<i>Net weight</i>	<i>Variation</i>
50g	0·25g
100g	0·3g
200g	0·4g

By standard deviation terms these figures indicate that 95% of the containers filled would be within 0·5g, 99% would be within 1g, and 99·9% would be within 1·5g if the filling weight was 50g, and pro-rata for other weights.

Both gross weight and net weight systems can be used as multiples. As gross weight units they are used for filling soups, sugar and milk powders into cartons. As net weight units they are used for filling coffee into glass and metal containers, and milk powders and baby powders into cans and cartons.

The systems can be coupled into carton making, forming and sealing machines, either as part of the machine or as a separate unit.

New bulk handling system at Nabisco Frears

A new bulk handling system, part of a £250 000 modernisation programme at Nabisco Frears' factory at South Wigston, near Leicester, recently came on stream. The system was designed and installed by Baker Perkins.

The plant has a capacity of 192 tons and was tailored to take account of the exacting problems posed by the layout of the existing premises. The plant had to be installed without disrupting production, and baking continued normally throughout the period of changeover from manual to bulk ingredient handling.

Significant savings in labour have been made possible together with an increase in throughput and improved quality control, it is stated.

Ingredients handled by the plant are flour, granulated and milled sugar, fat, syrup water and other liquids. Distribution is controlled from a single room which houses three panels. These panels control the bulk distribution of the flour, the sequencing and batch weight of flour and sugar, and the sequencing and quantities of liquids required. The capacities of the flour and sugar weighers are respectively 450 and 225kg. Actual weighments are fed to the mixers automatically according to plant requirements. Recipes are recorded in the control room by selecting weights from any two of three flours and two sugars on digital weight setters. There are facilities for setting a full range of independent weights for each of the five mixing points. The route to be taken by each

ingredient is programmed by the use of indicating selector switches on the control panels.

Operation of the plant

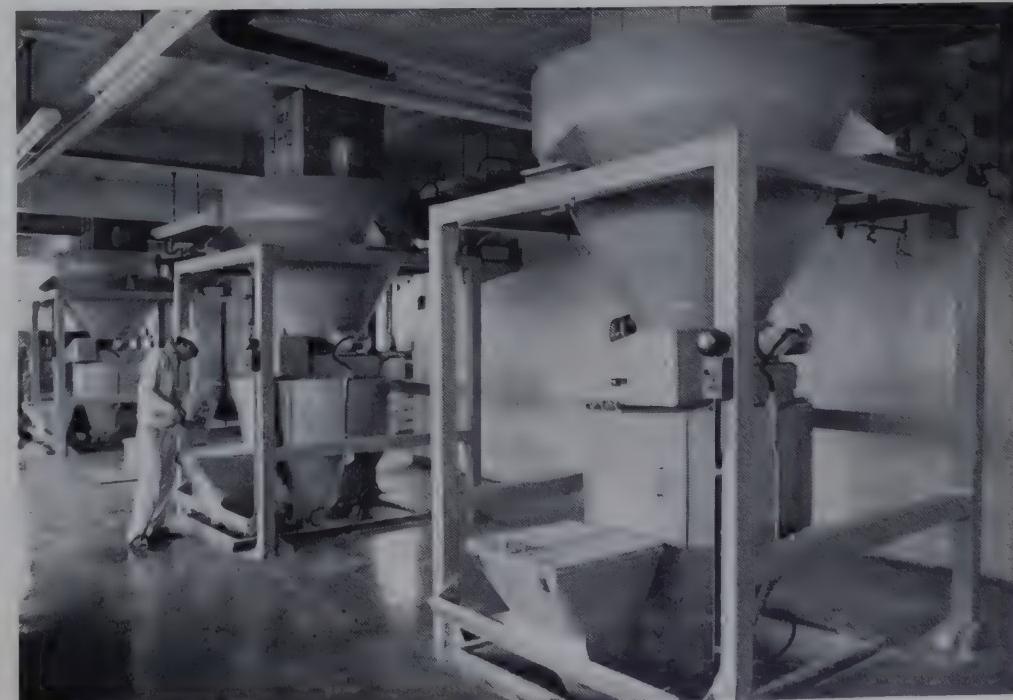
The six silos, four for flour and two for sugar, can be filled by one of three methods: by tanker with its own blower; by tanker with plant-based blower; or from a dump bin using the plant-based blower. Filling is automatic, with safety and alarm interlocks. If necessary, the flour silos can be discharged back into the tanker or their

contents transferred from one silo to another.

There are three flour service bins which can be filled from the silos or from the dump bin, sifting being automatic. The bins are automatically topped up.

The granulated sugar service is automatically refilled when necessary from the main sugar silos and is fitted with a twin discharge arrangement which feeds granulated sugar either direct to the central sugar weigher or into a sugar milling system.

Flour, sugar and small ingredients are fed to the mixers below by the hoppers





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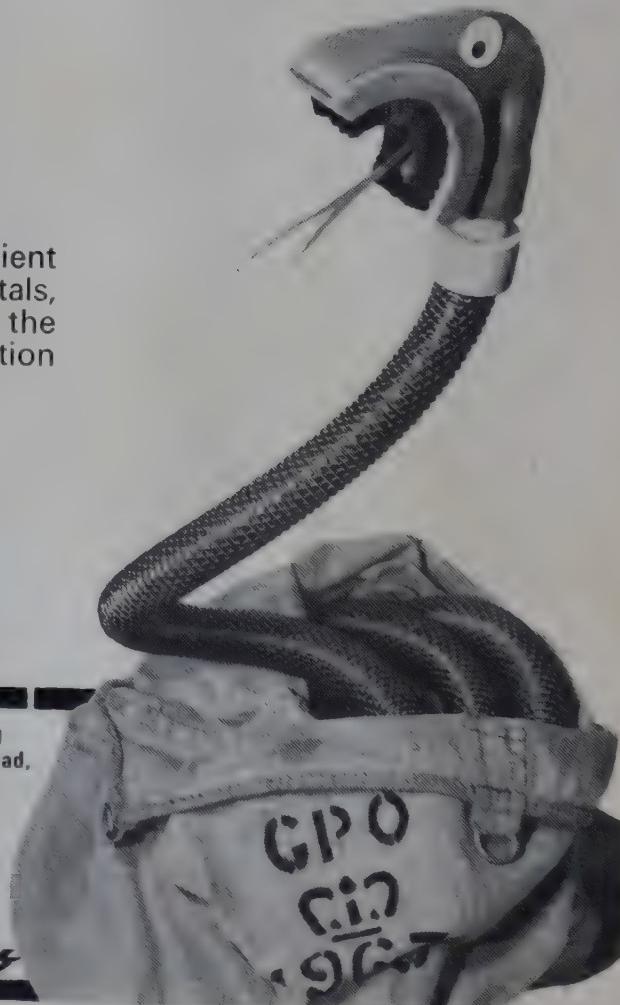
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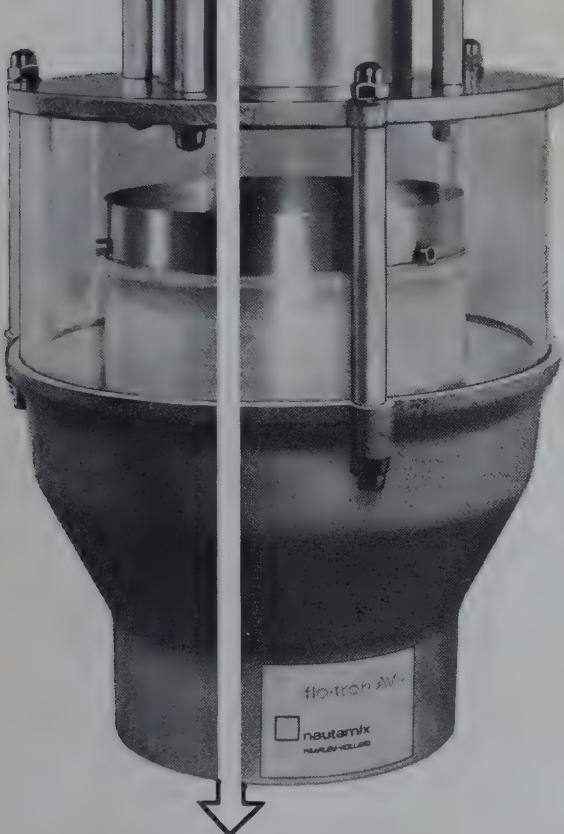


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BETTER POWDER FILLING

D. A. Marks B.Sc.(Eng.), C.Eng., M.I.Mech.E., M.Inst.Pkg.
Managing Director, Transmatic Fyllan Ltd

Improvement of powder filling by the bottom-up technique described is primarily aimed at those handling powders and granules by the auger method, but the principles involved are equally applicable to pastes and liquids

The conventional approach to auger filling of rigid containers is illustrated in Fig. 1. A container is placed underneath a discharge nozzle either manually or automatically, and the shot of powder is 'squirted' into the container. While this may be a simple method of filling, there are a number of disadvantages which may be present in differing degrees depending upon the nature of the powder. These are:

1. The product, in discharging freely from the nozzle into the container, will entrain air during its downward motion. Its bulk density will temporarily decrease and this will lead to the need for a larger container than is strictly necessary in order to accommodate the quantity of fill. In due course the entrained air will be released and there will be significant free space at the top of the container, which may bring adverse consumer reaction.

2. As the powder is filled into the container, air is displaced and must escape through the top. The upward rush of air meets the down-coming powder and carries some of it out of the container in the form of dust. Clearly the narrower the neck of the container the greater the air velocity in this region and the more dust will be made. Not only may this produce an unsatisfactory environment for the machine operator, but it may also foul the mouth of the container, making it difficult to seal.

'Bottom up' filling represents a refinement in filling technique which is simple in its concept and can produce very worth-while improvements in packaging.

With this technique the container is raised prior to the start of filling until the nozzle is close to the bottom of the container. As the fill proceeds the container is lowered in a controlled manner so that the relationship between the end of the nozzle and the surface of the powder is maintained constant. The principle is illustrated in Fig. 2.

In some cases it may be desirable for the nozzle to be kept just above the surface of the powder, but in other cases the nozzle may be actually under the surface of the powder, giving a compression effect.

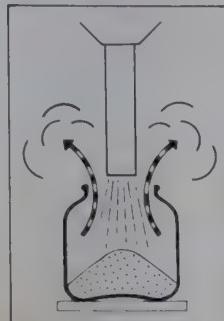


Fig. 1

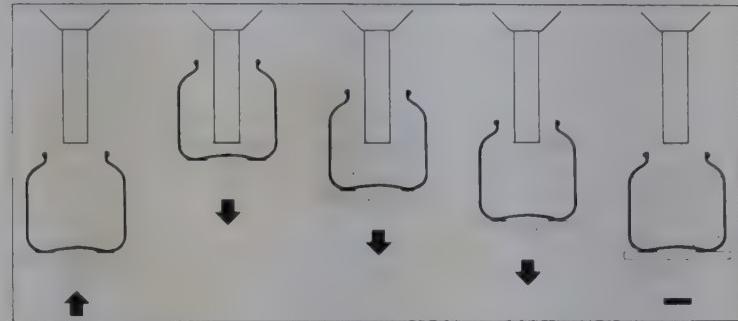


Fig. 2

Advantages

The advantages of either of these arrangements are:

a. A more dense packing of the material because there is no entrainment of air. This can lead to a reduction in the size of the container with its attendant savings in cost and reduction in ullage space.

b. The virtual elimination of dust because the expelled air, in rushing through the container neck, does not meet powder. Thus the closure area will be maintained in a clean condition.

Controlling the downward motion

The success of the operation depends upon the proper control of the downward motion of the container during the filling operation. There are two basic ways in which this may be done:

1. A positive displacement arrangement in which the container is lowered at a predetermined rate in relation to the discharge of the powder.

2. A pressure- or weight-sensitive arrangement in which the downward motion of the container is controlled by the weight in the container or the pressure exerted by the nozzle on the surface of the powder.

In general, it may be said that the positive displacement arrangement is most suitable for filling rates above 20/min. The control of the downward motion may be either mechanical, using cam and lever, or by hydraulic actuation. The mechanical approach gives the best results at the higher speeds due to its better control of acceleration rates, but hydraulic control may be satisfactory at intermediate speeds where the

rate of container acceleration is not critical.

With larger dose sizes and lower speeds, there can be significant advantages in having a weight- or pressure-sensitive fill in which the downward motion responds to the contents of the container or the pressure exerted on the powder surface by the filling nozzle. This is particularly worth while if there are variations in bulk density of the powder, or a tendency to bridge or starve the filling machine of powder. The downward motion of the container is governed either by a controlled pneumatic force or by a deadweight or spring.

Fig. 3 illustrates a simple automatic filling machine with the container lift actuated by cam and lever. Such a machine is capable of 60 fills per minute from a single head, although the particular example shown here is operating at 30 fills per minute.

Fig. 4 shows the filling station in greater detail. In this case a 'compression' fill is employed and the thick cylinder around the auger retains the powder under pressure during the filling operation.

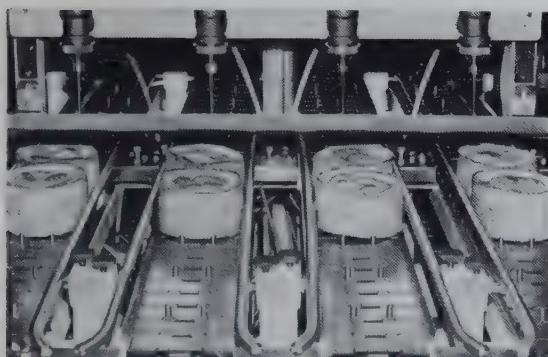
Higher speeds

The advantages of the mechanical system of container positioning are best illustrated by considering a container of elaborate shape as shown in Fig. 5. If the desired objectives of bottom filling are to be obtained, then for a constant rate of discharge of powder the downward motion of the container must vary according to its internal cross-sectional area. At the 'waist' of the container the rate at which the level

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Fig. 3

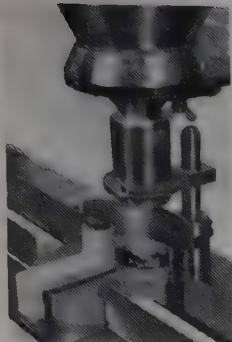


Fig. 4

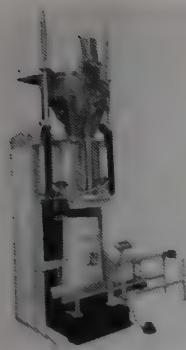


Fig. 6



Fig. 7

rises will be higher than at the base or at the top, and therefore the rate of fall of the container during the bottom filling operation must be correspondingly greater. Referring to the diagram, it will be seen that the container is initially raised to the filling position quickly. The fill may be initiated at the top of the stroke or in fact slightly before the top of the stroke to obtain optimum filling speeds. The rate of fall at any point is determined by the shape of the container. At the termination of fill, the nozzle is still inside the neck, and the container is then accelerated rapidly away from the nozzle in order to give the clearance for subsequent removal. Care is taken, of course, that the acceleration rates are such as not to allow the powder to jump out of the container.

Slower fill rates

We turn now to the alternative method

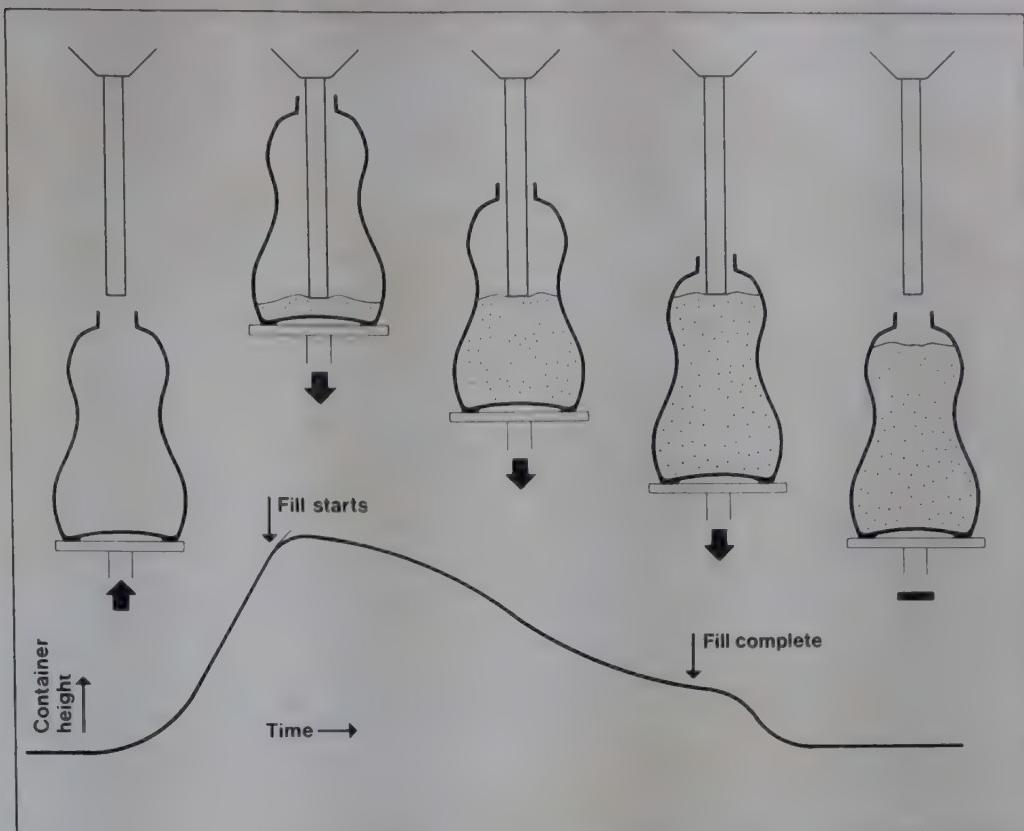


Fig. 5

for control of the downward motion with slower fill rates. There is a choice between:

(a) a weight or constant force system;
 (b) a spring or varying force system. This depends very much on the nature of the powder or granule and the weight or shape of the container to be filled. In the example of a sack filler shown in Fig. 6, 56lb of milk powder is filled into multi-wall paper sacks at 4/min. Here a spring controlled descent is used, i.e. the vertical position of the sack is determined by the amount of powder in it as if suspended by a simple spring balance.

It is to be noted that the use of a deadweight opposition to motion here would be quite unsatisfactory since as soon as the weight of powder in the sack had reached that of the counter-

balancing weight, the descent of the sack would begin and would be practically out of control thereafter.

Fig. 7 illustrates the alternative approach used to pack a light granule into a limited space with the minimum of ullage. Here the downward motion is governed by either a deadweight or a constant pneumatic pressure so that throughout the downward motion of the container the auger is made to exert a uniform downward force on the powder surface.

What I have tried to illustrate here are the fundamental principles and two basic methods of bottom filling control, but there are many occasions when combinations of these principles are used to solve specific filling tasks. So if you have a dust or ullage problem, remember—try 'bottom up'.

BOOK REVIEW

Industrial microbiology

Progress in Industrial Microbiology (1972: Volume 11). Edited by D. J. D. Hockenhull. Churchill Livingstone, 1972, pp 276 (with index), price £5.50.

This book is one of a series, the purpose of which is 'to provide a continuing review of developments in applied microbiology which will enable the specialist to keep up to date in his own subject. Topics are taken from bacteriology, biochemistry, botany, chemistry, and chemical engineering, food science, and

mathematics, and the selection of contributors is international' (to quote from the dust cover).

The contents of this volume are: 'The antibiotics of bacillus species' by H. L. Sadoff; 'Carotenoids in fungi and non-photosynthetic bacteria' by T. W. Goodwin; 'Continuous brewing' by J. S. Hough and A. H. Button; 'English cidermaking' by F. W. Beech; 'Synchronous culture' by J. Zeuthen *et al.*; and 'Toxigenic algae' by M. Shilo.

Perhaps of most immediate interest to food manufacturers are the chapters

on continuous brewing and cider-making, although the other sections contain more of industrial interest than their titles would indicate. We learn from Shilo's paper, for example, that the contribution of micronutrients in effluent to inland and offshore waters is such that heavy algal growth is stimulated. Some of these algae produce toxins many times more powerful than any terrestrial venom. These may be concentrated in shellfish, 'making the Coquilles St Jacques of the rich as dangerous as the cockles of the poor'.

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169	179	189	199	209	219	229	239	249	259	269	279	289	299	309	319

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ANALYSIS

Tin and iron

A new method for the determination of tin and iron in canned vegetables and fruit juices in one sample is described. The two metals are complexed with EDTA and the excess of EDTA is back-titrated at pH 5·6 with lead nitrate. Tin is then converted to the fluostannate complex and the liberated EDTA is titrated, giving the tin value. The difference between both titration values gives the quantity of iron.—H. Zohm, *Z. Lebensm.-Untersuch.*, 1972, **149**, 30.

Rapid detection of *coli*

A new medium for the detection of *E. coli* in milk, milk products and particularly in ice cream has been developed. It contains tryptophane, lactose and bile salts and is based on the ability of *E. coli* to produce gas from lactose and indol from tryptophane. A large number of *E. coli* strains and of ice cream samples were examined. The medium proved to be very efficient.—M. Refai and R. Rohde, *Z. Lebensm.-Untersuch.*, 1972, **149**, 33.

Polarimetric determination of starch in maize

The use of 90% dimethyl sulphoxide at room temperature as an extraction solvent for starch from the maize kernel compares very favourably with the customarily employed hot calcium chloride extraction. The combination with accurate and rapid polarimetric readings obtainable with an electronic instrument gives good results. Recovery of different starches from corn varied in the following order of increasing difficulty: high-amylase, waxy and ordinary. The length of grinding and agitation time can, however, be chosen to give completeness of extraction. Such optically active substances in corn as hemicelluloses, zein and sugars did not interfere with the starch determination by the new method. The procedure, measurement technique and starch computation are described.—W. J. Garcia and M. J. Wolf, *Cereal Chem.*, 1972, **49**, 298.

Mercury and copper

The digestion of the food or biological samples is carried out with sulphuric and nitric acids and hydrogen peroxide under refluxing to prevent loss of mercury. A simultaneous extraction of mercury and copper uses dithizone in acid solution. Copper can then be analysed directly by the one-colour-method at 571nm since mercury does not absorb at this wavelength. The determination of mercury requires the separation of the dithizonates. In this step dithizone and the oxidation products have to be removed, as they

ADVANCES IN FOOD TECHNOLOGY

might simulate a higher mercury content. Two new procedures were worked out for the separation, namely a thin-layer chromatographic technique and an adsorption chromatographic procedure with sodium hydrogen carbonate as an adsorbent. The method was successfully applied to the determination of mercury in a large number of commercial fish and shellfish preserves.—H. Woidich and W. Pfannhauser, *Z. Lebensm.-Untersuch.*, 1972, **149**, 1.

Methyl mercury in fish

A rapid semimicro method for the determination of methyl mercury in fish muscle is described. The procedure involves extracting the methyl mercury into toluene as methyl mercuric bromide, partitioning the bromide into aqueous ethanol as a thiosulphate complex and re-extracting into benzene as methyl mercuric iodide. Quantitation is carried out by gas chromatography. The method is sensitive to 0·01ppm. Recoveries were 99%. The amounts of both methyl and total mercury found in a variety of tissues of aquatic animals are compared.—J. F. Uthe *et al.*, *J.A.O.A.C.*, 1972, **55**, 583.

Determination of amylase activity in honey

A simple kinetic method is described to determine the amylase activity in honey and to examine whether or not honey has been submitted to undue heating. Buffered honey and starch solutions are blended in a thermostatically equipped vessel. Samples are withdrawn at intervals and treated with iodine solution. The blue colouring is measured spectrophotometrically. From the initial linear reaction curve, the amylase activity can be computed. Optimum reaction conditions such as pH, temperature and common salt addition have been established and detailed working procedure is described.—K. Zürcher and H. Hadorn, *Deut. Lebensm.-Rundschau*, 1972, **68**, 209.

DAIRY PRODUCTS

Gamma-glutamyl transpeptidase in milk

The effects of pasteurisation, milk constituents, species of animals, breeds of cattle and post-partum changes on the activity of gamma-glutamyl transpeptidase (GGTP) of milk were investi-

gated. Whole milk on pasteurisation at 72°C for 15 seconds lost on an average 78% of the activity of GGTP in contrast to only 18% on pasteurisation at 60°C for 30 minutes. Considerable variation was observed in relation to the heat stability of the milk enzyme. Dialysis of milk enhanced the GGTP activity of the milk slightly. Of the dialysable milk constituents, only lactose and citrate had a small inhibitory effect, whilst proteose-peptone, acid and micellar casein had no effect. However, significant amounts of the enzyme were associated with acid and micellar casein.—G. C. Majumden and N. C. Ganguli, *Milchwissenschaft*, 1972, **27**, 296.

Changes during cheese ripening

The changes in peptides, amino acids and non-protein fractions level in cheese during ripening were studied in cheeses prepared from cow and buffalo milk. After 140 days of ripening, the quantity of the released peptides had attained a steady state. The maximum number of peptides released which differ in their molecular size was in a period from 140 to 160 days. Free amino acids appeared in cheese within seven days of ripening, their maximum number appeared within 56 days in cow milk cheese and within 77 days in buffalo milk cheese. During the rest of the ripening, there was no marked difference in the amino acid pattern at qualitative level. The non-protein level in cheese increased with the ripening period.—A. Singh and N. C. Ganguli, *Milchwissenschaft*, 1972, **27**, 412.

Manufacture of white pickled cheese

Comparative studies were made to work out a standardised manufacture of white pickled cheese from fresh and pasteurised milk. Fresh milk cheese of the best quality with smooth and mellow texture and highest flavour scores was obtained when milk with 6% salt content was used and ripening carried out at 20°C in air-tight tins without salt whey. After seven months of ripening, the residual flora ($1\cdot03 \times 10^6$ per gram) consisted of 10% *Streptococcus faecalis liquefaciens*, 10% *Streptococcus faecalis zymogenes* and 80% atypical *Str. faecalis*. Similarly good quality cheese was also produced from pasteurised milk with 6% salt content by the use of 0·75–1·0% of a mixed culture of *Streptococcus faecalis* strains, previously isolated from fresh milk

cheese, as a starter. Production of gas by *Aerobacter aerogenes* could be inhibited with 1·0% of the starter. Cheese made from pasteurised milk with 9% salt had good flavour. Less flavour developed in cheese kept at 7°C than in cheese kept at a higher temperature. Ripening with whey or use of 9% salted milk gave cheese with smoother texture than cheese ripened without whey or the use of a lower salt level.—I. G. Abo-Elnaga, *Z. Lebensm.-Untersuch.*, 1972, **149**, 18.

FATS and OILS

Oxidation of oils by light

In the course of a study of the influence of light on the oxidative deterioration of edible oils, the dependence of the rate of oxidation on the wavelength of the incident light was experimentally examined. A distinct decrease in the oxidation rate with increasing wavelength was observed for soyabean, sun flower and peanut oils, when these oils were irradiated with various coloured lights having the same quantum-density. Absorption curves for these oils were determined. Short wavelength light was completely absorbed, long wavelength light was barely absorbed to any measurable extent. A considerable increase in quantum yield during oxidation occurs with increasing wavelength. In spite of this, the oxidation of oils is catalysed mostly strongly by short wavelength light. Pure absorption is considered the decisive factor with regard to the dependence of photo-oxidation on wavelength. Finally, the rate of oxidation as determined in darkness was found to increase with decreasing wavelength of light used for pre-oxidation of the oil.—G. Paul *et al.*, *Fette und Seifen*, 1972, **74**, 359.

FISH and FISH PRODUCTS

Production of FPC

The production of a high-protein concentrate for enhancement of the nutritional quality of wheat flour and baked products generally employs a chemical solvent extraction process for the separation of oil and water from raw fish. Commercial extraction processes for the manufacture of fish protein concentrate were developed empirically without the use of ternary equilibrium diagrams and there are inconsistencies in the literature concerning the relative merits of ethanol and isopropanol as the most satisfactory solvents and also concerning the effect of water on the extraction efficiency of these solvents. A mathematical treatment of data obtained for several three-component systems at different temperatures has led to ternary equilibrium diagrams, which are presented and discussed. The curves indicate that isopropanol may be a better solvent

than ethanol for the extraction of lipids and water from raw hake and menhaden, which were used for the tests. There is a minimum water content for the oil extraction which will affect the efficiency of the solvent used.—A. D. McPhee *et al.*, *J. Chem. and Eng. Data*, 1972, **17**, 244.

MEAT and MEAT PRODUCTS

Function of fats in meat products

The technological functions of fats in finely minced meat products were studied. Frankfurter-type sausages are a complex of at least three systems, *i.e.* a suspension of cells and coarser tissue constituents, a gel from the protein substances of the muscle and connective tissue, and an emulsion with parts of the muscle protein of the fats released during mincing. The finely minced fat influences the consistency, water retention, drying, colour and flavour. A liver sausage is an oil/water emulsion in which the liver protein is the emulsifier. The processed fat ensures spreadability even in the cold. In black pudding, the coarsely chopped fatty tissue is enclosed in a connective tissue mixture which coagulates on heating. Dry sausages consist of raw meat and bacon fat. The fatty tissue encourages water vapour removal and helps to dry the sausage. The storage life is determined by fat spoilage. The fat greatly influences the heat penetration so that the degree of mincing of the fat and its conduction capability are particularly important.—F. Wirth, *Fleischwirtschaft*, 1972, **52**, 605.

Starter cultures in meat curing

Experiments were carried out to find bacterial strains for use under practical conditions when curing meat products. Strains which were tolerant to varying common salt contents and capable of growing at different low incubation temperatures were selected. The effect of strains on the redox potential of the medium was another criterion of suitability. In a process of elimination, 40 bacterial strains were left for a more detailed examination. Their nitrate reduction capabilities and their positive or negative catalase behaviour were first tested. Subsequently the chosen strains were used as starter cultures in meat curing tests. On the basis of the results obtained, all organisms which did not grow well in salt brine which produced a noticeable aroma and which were catalase-negative were again eliminated. Finally only five strains were left, which showed promise and which were examined comprehensively. The possibility of freeze-drying the individual strains and of using the freeze-dried bacterial preparations in the manufacture of cured products was then studied.—E. Petäjä *et al.*, *Fleischwirtschaft*, 1972, **52**, 839.

Thermal capacity of animal fats during melting

The thermal capacity of beef, pork and mutton fat was determined as a function of temperature in the range +10 to +60°C. A special method was worked out which uses simple equipment, namely an air thermostat and a microcalorimeter made of brass. All three fat condition phases, *i.e.* solid, melting and liquid phases, are included in the temperature range. The dependencies were determined in a graph on the basis of about 12 tests with each kind of fat. The thermal capacity was measured by making use of a high thermal resistance to the heat insulation into which the microcalorimeter is placed. This creates a constant heat transfer value in the course of each experiment.—W. M. Gorbatow *et al.*, *Fleischwirtschaft*, 1972, **52**, 773.

Technology of braising meat

Almost all cuts of meat can be braised. The temperature of the process has to be carefully controlled if the eating quality is to remain high and cooking losses are to be kept low. A new version of the method involving much slower stewing and utilising the natural dissolution of collagen is described and its technology is discussed. The braising entails two processes, *i.e.* browning for a short time in an open container at 150–200°C and stewing for a long time in a closed container at 80°C. Due to the great differences in heat conduction in various pieces of meat, the time to reach the required core temperature greatly varies. Cooking with excess pressure reduces the stewing time considerably but also reduces the eating quality. In the slow braising method the tenderising effect of the natural enzyme collagenase is used. When braised meat is stored in the cold and heated up again or when it is kept hot for a long time, an unpleasant 'heated-up' flavour develops. This can be avoided by preliminary cooking at low temperatures of about 40°C, the cooking process being completed shortly before the meat is eaten.—D. J. Tilgner, *Fleischwirtschaft*, 1972, **52**, 853.

MICROBIOLOGY

Poisoning by *Vibrio parahaemolyticus*

Outbreaks of food poisoning caused by *Vibrio parahaemolyticus*, an enteropathogenic, gram-negative microbe, universally distributed in the marine environment, are discussed. The organism has been isolated from seafood, marine fish, shellfish and crustaceans (crabs and shrimps). The serology of the organism has been worked out. Special tests for the presence of the organism are recommended.—M. Fishbein and J. C. Olson, *Alimenta*, 1972, **11**, 93.



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SEEN AT PAKEX

The International Packaging Exhibition—Pakex 72—was held at Olympia, London, in October. Interesting exhibits not covered in our preview in the September issue are described briefly here

MATERIALS

System based on nylon/PE laminate

Smith & Nephew Plastics showed their comprehensive system based on Synthene, a co-extruded nylon/polyethylene film. Particularly suitable for meat, the system makes use of the Swissvac range of machines which comprises the Bulk Packer (a machine for packing large products), the Systematic (a console machine with conveyor for off-loading), the Major (designed to take large meat joints or small bacon packs), the Popular (small compact machine with its own vacuum pump) and two new models, the Tandem and the Transmatic (the Tandem consists of two Transmatics in one cabinet with one pump operating both chambers). Circle 201

Developments in flexible packaging

Metal Box Co showed several new developments in flexible packaging including a maturation and distribution vacuum pack in nylon/polyethylene laminate for 10lb of cheese; a non-returnable lightweight fresh milk pack made from reel-fed Diothene on a fully automatic Prepac machine; a heat-sterilisable foil laminated retort pouch for a wide range of perishable foods; a laminated transparent flexible pack for hot filling or for in-pack pasteurising of high-acid foods; and in-line thermo-formed vacuum-sealed fresh meat and cheese packs made from two webs of nylon/polyethylene with registered position print design.

Circle 202

CONTAINERS and CLOSURES

New lightweight plastic containers

Plysu Containers showed two new containers, a 20-litre and a special purpose 5gal. The former is designed to offer an alternative size in the 5gal market with the benefits of a bulk container yet with lighter weight and greater ease of handling than a 5gal drum. The large handle provides easy handling and it is stated that the container when filled is light enough for women to handle.

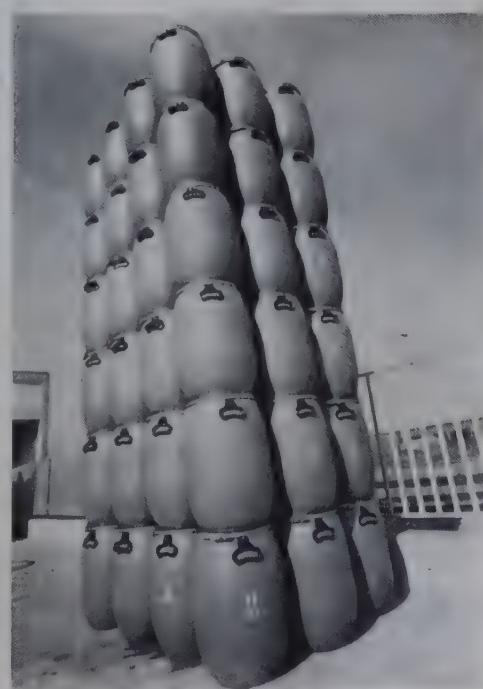
The special purpose 5gal container is strengthened to provide greater stacking



The new 20-litre version of Plysu Containers' R70 container.



Dickenson's new ice cream gateau container with flanged lid and tear tab



Stacked 60-litre Multitainer open-top drums.

and storage ability. It will stack six high—two high on a pallet three pallets high, providing economies for users whose products need to be stored but who are unwilling to waste storage space by using containers which stack only three or four high.

Circle 203

Among a variety of containers, some partially and fully transparent, shown by John Dickenson & Co was a new rigid ice cream gateau box now available as a stock line. Produced from high-grade pasteboard, it consists of a strong circular drum, a loose base disc and an ingenious flanged lid which protects the decorative topping. The contents are extruded directly into the drum to marked filling levels and frozen. Pack is opened by pulling a tear tab. Two sizes are available: 6in dia and 3½in deep, and 8½in dia and 3½in deep.

Circle 204

Drums and bag-in-box containers

Polythene Drums Ltd showed a range of Multitainer open-top and closed-end plastic drums to mark the announcement, on the opening day of the exhibition, of an agreement giving the company an exclusive licence to manufacture and sell the range of Multitainer drums and Falttainer bag-in-box containers in UK and Ireland. The licence agreement, made with Elbatainer Kunststoff- und Verpackungsgesellschaft of West Germany, covers Multitainer drums from 20 to 250 litres, Falttainers with capacities from 5 to 25 litres, and Elbatainer's range of square-round lightweight powder drums.

Circle 205

New lug cap for bottles and jars

A new twist-off lug cap was unveiled by U.G. Closures & Plastics. Bottlers of pickles and preserves will be among the first users, for whom the two sizes—58 and 63mm—that are being produced initially are particularly suitable. Other sizes, suitable for such products as sauces and pasteurised fruits and vegetable, will be available shortly, it is stated.

The new closure is a quarter-turn four-lug tinplate cap that provides a vacuum-tight seal; it is designed for use on existing glass finishes with existing application equipment. Machinery for

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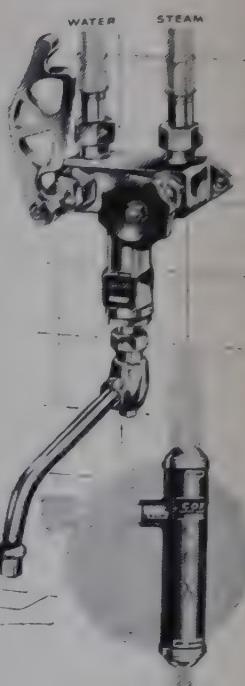
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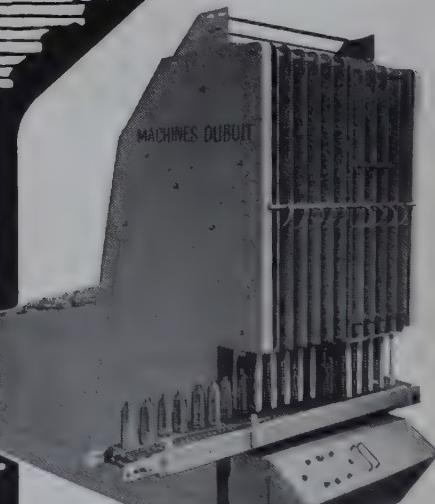


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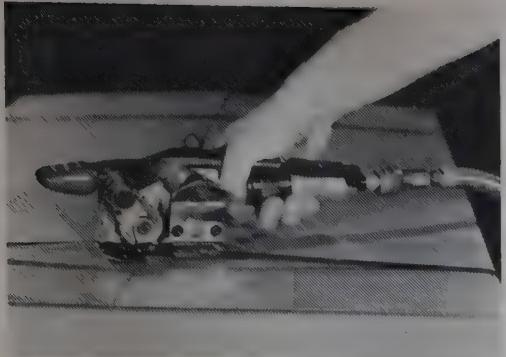


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Signode's VFD hand held strapping tool

applying the closure is available from U.G. if required.
Circle 206

MACHINES

New sealing machines

Tesa Tapes Ltd showed two new sealing machines. The larger, the Automat 6067 case sealing machine, automatically U-seals the tops and bottoms of cases at a rate of up to 600/hr, it is stated. Can be set for a wide range of case sizes up to 55×55×70cm. At the other end of the scale is the new 6259 carton sealer, weighing only 15oz and suitable for many office and packing room jobs, using tapes up to 50mm wide and 132m long.

Circle 207

New strapping equipment

Signode introduced a new range of equipment and strapping ranging from small hand-held tools to fully automatic production line equipment. For wet applications, including frozen foods, fish, meat and poultry, the MD-3-DD high-speed strapping machine is suitable, using Contrax copolymer strapping. A hand-held machine is the VFD tool for Dymax nylon or Contrax copolymer strapping.

Circle 208

Tea bag machine

IMA of Bologna, Italy, showed a new machine, the C50, for filling tea or herbs into heat-sealed filter bags sealed on four sides without string and tag. Output exceeds 1000 bags a minute, it is stated. Attachment is available for automatic erection and filling of cartons of sizes varying from 16 to 150 bags per carton. Cartons are erected from blanks. Only one operator is required.

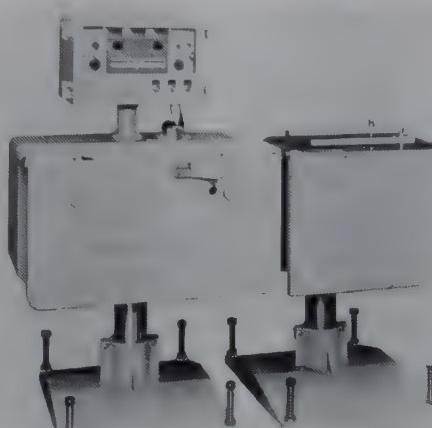
Circle 209

Bagging machines

John Pelkman Engineering Co showed two models from their range of Klipfix baggers designed to bag a wide variety of goods in a neat and efficient manner. On one of these, the model 300, the articles are hand fed into the bags which are opened by air from a built-in blower. An ingenious and simple mechanism grips the neck and closes it



Model 300 Klipfix bagging machine from John Pelkman Engineering Co



Anritsu K501D checkweigher from Freeze Pack (Machinery)



Elvis L-sealer and shrink tunnel shown by Hamilton Machinery Sales

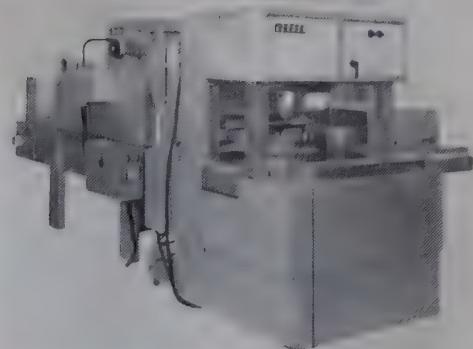
with a strong clip which can be code printed if required. An elevating conveyor then lifts the clip-closed bag to a convenient height for take-off. The material for the clip, which is automatically fed from a reel, consists of a twin wire with either a paper or plastic web which is available in many colours and designs.

Circle 210

New shrinkwrapper

Among machines showed by the Lerner Machine Co was their new automatic high-speed shrinkwrapper model, SW30/HSS, designed to operate at 40 packages per minute and to deal with can line speeds of 960cpm in 24s and for a wide range of other products requiring outputs exceeding 30 packages a minute.

Circle 211



High speed shrinkwrapper and tunnel model SW/30HSS shown by Lerner Machine Co

Sealer and shrink tunnel

Hamilton Machinery Sales Ltd have been appointed UK and Ireland distributors for the Elvis range of packaging equipment from Denmark. An L-sealer and shrink tunnel from this range was shown for the first time. The product to be wrapped is placed in centre-folded film by an operator and pushed forward under the heat sealing frame. The operator lowers the frame, which rises automatically when the seal has been made. Also shown were new Bekum blow-moulding machines, automatic and semi-automatic shrink wrappers, a shrink gun for low-cost shrink wrapping of complete pallet loads, and a tray erecting, loading and sleeve shrink wrapping line.

Circle 212

New labellers

Morgan Fairest showed two new additions to their new range of labellers for body and neck or back and front and neck labelling, the MF N300 and MF N450 for continuous outputs of 300 and 450 bottles per minute. The new range will eventually include nine models for speeds up to 1000 bottles per minute, all incorporating a stationary label magazine, mechanical label transfer and a recirculating adhesive system for an overall or patterned glue area.

Circle 213

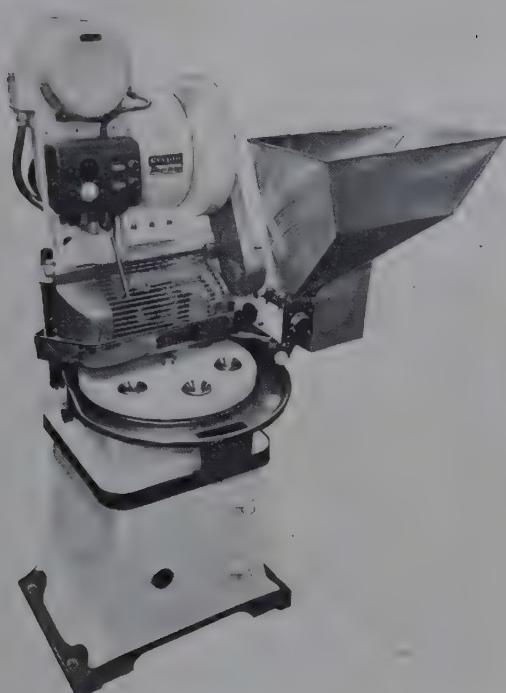
Checkweighers from Japan

Freeze Pack (Machinery) Ltd showed three ranges of machinery, the Autochecker range of checkweighing machines, the Pachema tray and carton erecting and closing machinery, and the Senzani vertical carton erecting, closing and filling machine. The Autochecker range is manufactured by the Anritsu Co of Tokyo, and the models shown were the K501D for checkweighing up to 150 pieces per minute (up to 300/min for cans)—product change-over time is claimed to be two minutes, the K513A machine, a low capital cost machine (c £700) for the low to medium speed range, and the K502D for checkweighing to very fine accuracies.

Circle 214

PIES, TARTS AND FLANS

whatever the output, we're never put out

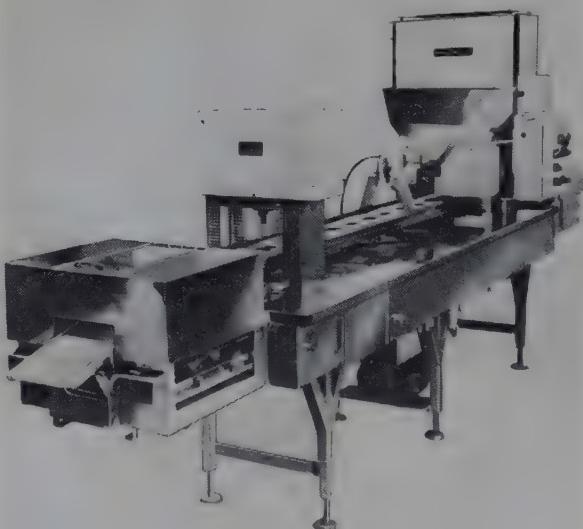


ABOVE:
Left: O'Matic Standard
Right: Handomatic

BELOW:
Left: O'Matic Minor
Right: Linamatic



Whether you need an output of hundreds an hour or thousands, there's a CRYPTO-PEERLESS Pastry Moulder and Filler to match. All models feature heated machine-cut dies with simmerstat control to give perfect moulding and even thickness. There's the hand-operated HANDAMATIC; up to 450 pieces an hour—up to 10" diameter. For up to 1200 pieces an hour you'll need the O'MATIC MINOR with optional automatic jam or soft fruit filler attachment. Larger producers will find the O'MATIC STANDARD ideal; it moulds, crimps, cuts and fills (twice if needed) up to 2,000 pieces an hour—there are dry and wet meat fillers that deposit *exactly* the given quantity. The Linamatic In-Line Production Machine—each one customer built for stream-lined quantity output, will deposit foils, divide the paste, mould, fill and lid your pies with considerable labour savings. Built to the highest standards of safety and hygiene.



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Handomatic O'Matic Standard
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FM 279

Circle No. 33 on reply card for further information



Laboratory enrober

The Sollich Mini Enrober shown by Otto Hänsel Machinery Ltd offers the factory laboratory an 11in wide enrober with inbuilt automatic tempering based on Sollich's patented recirculation system. Its capacity of 100kg/hr of tempered chocolate can also be tapped off for other jobs in the factory, it is stated. Also shown was a Hänsel traypacker for bottles, cans or cartoned product which forms a prefed tray blank around the assemblage to produce a tight pack for subsequent shrink wrapping.

Circle 215

Shrink wrapper for pallets

Latest addition to the range of shrink wrapping equipment from Modern Industrial Appliances Ltd is the Palletite lift-off shrink film oven, which was unveiled at the exhibition. It is claimed to have the advantages of the oven type system and the continuous tunnel but with greatly reduced capital, installation and operating costs. Powered by electricity, LPG or natural gas.

Circle 216

Impulse heat sealer

New from A.I. Packagings Ltd was the Audion-Pronto hand-operated impulse heat sealer, a quick action unit that can be wall or bench mounted. It is supplied in kit form and can easily be fitted to existing sealers by connecting to the top sealing jaw, it is stated. Cycling is initiated by foot. Full timing facilities are incorporated.

Circle 217

Packs bottles in cases

Shown for the first time in UK was the Pak-Master Mk III on the stand of Rockwell Packaging Machines Ltd. Complete with automatic infeed, it packs glass bottles into cases without divisions, and the exhibitors say the machine shown was similar to one sold to Pernod in France, the third such which that company has bought. Also exhibited for the first time at any exhibition was the Senning model 5/7A/P carton overwrapper. This machine uses polyethylene film at speeds of 70/min.

Circle 218

Closes and glues cases

Shown for the first time in UK was the Wrapmatic self-adjusting case closer and gluer using hot melts, on the stand of Machinery Continental Packaging Ltd. Also new to this country was the twin-head in-pack case loader, representative of a wide range of bottle handling equipment; this incorporates a fully mechanical bottle transfer system, ensuring shock-free handling and positive bottle control, it is stated. The unit was shown coupled to a



The Australian-made Mogul starch moulding machine. Pictured on the stand are (L to R): J. Doyle, Trade Commissioner, Australia House; John Faerber, managing director of NID Pty Ltd of Sydney, the makers; P. Bartleet, director of Norman Bartleet Ltd; and F. Rose, sales director of Cantab Industries Ltd of Toronto, who represent NID Pty Ltd in USA and Canada



Machinery Continental Packaging's Wrapmatic self-adjusting gluer using hot melt.

Unimatic case erector with provision for manual insertion of divisions.

Circle 219

Makes stand-up bags

Stand-up bags stated to be suitable for packaging fruit juices, ready-to-serve meals and deep-frozen food can be made by the fully automatic Doypack machine, shown at the exhibition for the first time by Kalle AG. This machine, model SAD 2, uses reel-fed laminated film, incorporates forming, filling and sealing, and has a capacity of up to 3000 bags per hour of a volume of about 200ml each. The laminate is Hostaphan/aluminium/HD polyethylene boil-proof and sterilisable laminate for preserved foods, or Cellophane/aluminium/polyethylene for hot or cold sterilised fruit juices. The exhibitors say that in Germany and Yugoslavia the turnover of this type of bag approaches 500m annually.

Circle 220

Rotary vacuum filler

A new development shown by Albro Fillers & Engineering Co Ltd was a CT15 Mk II rotary filling machine with a vacuum filling system to bottle free-flowing liquids. This modified machine incorporates a new design of filling

nozzle, cam-operated container table and scroll feed, stated to give faster, smoother operation. Another new machine was a single-head rotary cap press for applying snap-on closures to the lighter type of plastic container, although it is equally suitable for closing more rigid plastic, glass and metal containers.

Circle 221

Tray packer

New machines from Doboy Ltd included the TP20 fully automatic tray packer specially designed for use with the company's range of automatic shrink wrapping equipment. It packs cans, jars or bottles into erected trays for presentation to the sleeve wrapper. Speed is up to 25 packs a minute in varying pack arrangements. Also shown were the Mk IV high-speed labeller with a speed of up to 100 labels per minute on heat-sensitive labels, the SW83D heavy-duty fully automatic sleeve wrapper, and other wrapping and sealing machines.

Circle 222

New coding machine

Among marking, coding and printing machines shown by Mark-O-Print Ltd was the new Markocoder BD1 self-contained bottom coding in-line unit with flexographic inking system. Output is up to 250 containers per minute on cans, bottles, jars, and other types of container. Stated to be easily adjustable to products of different dimensions. Also new was the Wrap-A-Printa 4000 continuous unit for printing open dates and codes on to all forms of wrapping material in web form; the unit synchronises and matches output of all existing conventional wrapping equipment, it is stated.

Circle 223

Makes aluminium closures

Fords (Finsbury) Ltd showed two

machines from their range of diaphragm and formed cap-stacking presses designed for making aluminium closures for dairy, soft drink and other food containers. The presses were introduced to the Continent at the DLG Exhibition in Frankfurt in July and Pakex was the occasion of their introduction in UK. Closures are punched out from a reel of foil and stacked in detachable containers for storage or transfer to a filler dispenser.

Circle 224

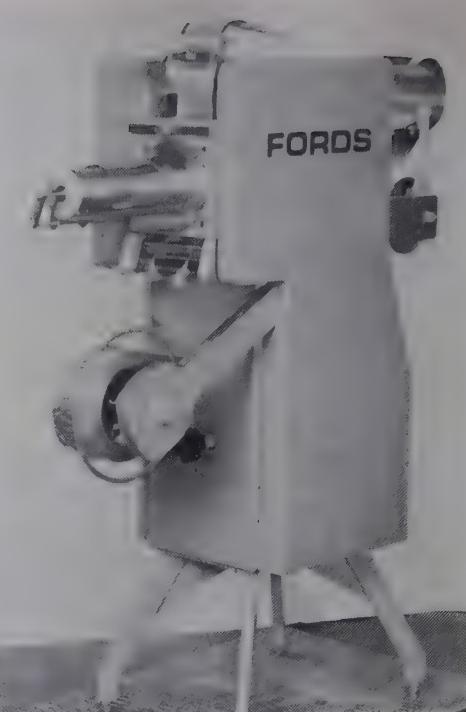
Australian confectionery machine

One of the largest machines in the exhibition was the latest version of the Mogul starch moulding machine from NID Pty Ltd of Sydney, which produces gums, creams, jellies and marshmallows.

Circle 225

THE US EXHIBIT

This year's US stand was the largest ever at the Exhibition and featured over 100 products from some 30 companies. The stand was sponsored by the United States Department of Commerce. Icore Division of Acurex Corporation, Mountain View, Calif, displayed a new checkweigher which accurately weighs and automatically separates containers or products on the basis of weight



Fords' new single-tool stacking press

measurement at high speeds without interruption of line flow. Claimed feature of the equipment is the elimination of external vibration thereby improving accuracy. It is compatible with Icore analogue or digital data processors and control systems for the servo control of filling machines or processes,

and weight recording and display.

A wide range of closures and dispensing devices from various manufacturers was displayed. Polytop Corporation of Slatersville, RI, showed the Lock-Top safety and child-proof closure, a frictionally held closure with a locking ring. A new closure idea which incorporates a raised diaphragm pour spout and a liquid dispensing pump for glass bottles and metal and plastic containers was shown by Rieke Corporation of Auburn, Indiana.

Tapele Corporation of Newton, Mass, displayed systems for applying a wide range of pressure-sensitive tapes including double coated and foam tapes.

A new lightweight small tool for high-speed nailing of wooden crates and pallets was shown by the Paslode Division of Signode Corporation. Angleboard, a strong laminated paper-board right-angle strip for crating, edge protection and unitising was also introduced by this company.

A hot-melt application system was introduced by the Aro Corporation of Bryan, Ohio.

A number of new code dating and label printing machines were shown, which included the Weber Marking Systems, model 40, a compact (26 x 11 x 8in) and inexpensive printer for address and identification labels.

Circle 226

NEW LITERATURE

WHY SPRAY DRYING? is the title of a reprinted paper originally delivered to an invited audience last June by Theo Looijenga, Reg Ing, of the Netherlands and the Delavan consultant for spray drying.

Circle 227

WESTFALIA CENTRIFUGES for the chemical and food processing industries are illustrated and detailed in a 12-page brochure from Westfalia Separator Ltd.

Circle 228

THE LATEST ISSUE OF THE WCB materials handling container price list is now available and describes a large number of containers specially developed for use in the food and food processing industries.

Circle 229

PLASINEX, a long-life protective plastic wall coating, is described in a leaflet published by Plastics & Resins Ltd.

Circle 230

A GUIDE FOR SELECTING variable area flowmeters has been issued by Wallace & Tiernan Ltd.

Circle 231

BASIC MATERIALS HANDLING with small and medium trucks is the subject of an introductory guide written by Colin Hardie and Joe Hyam and published by Crown Controls Ltd.

Circle 232

LEASING — THE QUESTIONS AND ANSWERS is the subject of a new publication published by Pye Unicam Ltd of Cambridge to coincide with their improved analysis and measuring instruments leasing rates.

Circle 233

THIRTEEN PRODUCTS from the specialist range of Kek Ltd, manufacturers of grinding, sieving, mechanical and pneumatic conveying equipment, are summarised in a new brochure. Technical data for each product is also available.

Circle 234

FOOD FREEZING WITH CO₂ is the subject of a leaflet produced by the Distillers Co who think this publication to be the only one available in the UK dealing specifically with this process.

Circle 235

A PROFILE of the European market for solid waste and sludge disposal

equipment is the subject of the latest report from Information Research Ltd.

Circle 236

PROCESS CONTROL INSTRUMENTATION manufactured by Fielden Electronics Ltd is described in a 32-page brochure published by this firm, which outlines all the major instruments in their range.

Circle 237

L-CYSTEINE HYDROCHLORIDE monohydrate and azodicarbonamide is the subject of one of the articles in the *Arkady Review*, vol 48, No. 1, published by the British Arkady Co Ltd. This booklet also contains an article on vegetable protein sources.

Circle 238

ALUMINIUM SILOS for bulk storage are described in a leaflet issued by E. C. Poyer and gives details of their range together with information on the fabrication services available from this company.

Circle 239

THE METRIC STOCK RANGE of stainless steel round bar available from John Cashmore Ltd is listed in their new folder.

Circle 240

Cooker for canned fruits

A new type of cooker for canned fruits has been developed by the Australian subsidiary of Kelly and Lewis Pty Ltd and will be available in this country by arrangement with Mather & Platt. The basic idea is that of a single loop configuration of a pair of chains connected by carrier bars on each side of the chain, similar in concept to a well-known double-side conveyor already in use by this firm. The upper part of the machine forms an atmospheric steam chest whilst the lower part forms a counterflow-type immersion cooler. Applications for which the machine is suitable are outputs of 100 to 200 cans per minute, cooking times of 10 to 40 minutes at temperatures up to 210°F. To date the machine has been built in two sizes, one suitable for cans of 15oz (16Z) and 29oz (A2½) maximum size.

Circle 241

Portable power generator

A portable power generator for emergency use in domestic and small commercial premises has been developed by Douglas Ellison Ltd. Ranging in output from 0.8kW to 3kW, the new Delite range of light-weight petrol-driven generating sets can be fitted with an automatic mains failure and 'power on demand' system. This incorporates a circuit which, on failure of the mains supply for any reason, detects whether or not power is required at that precise moment. If no power is required, then the generator does not start up but is prepared to start immediately on application of any load of 40W or upwards. Prices range from £177 for the 0.8kW set to £213 for the standard 3kW set or £382 for the 3kW model with automatic mains failure control.

Circle 242

Vibratory conveyor

An 80ft mechanical vibratory conveyor has been installed by Simon Engineering Ltd at Beechams' Horlicks factory at Slough. Powered by a single drive assembly incorporating 2 x 5hp motors, it operates at 960 cycles a minute. The ingredients are fed in surge loads every 12 minutes and the trough cover incorporates four inlets from the dryers. The unit is self-cleaning and the totally enclosed trough is said to ensure a dust-proof operation.

Circle 243

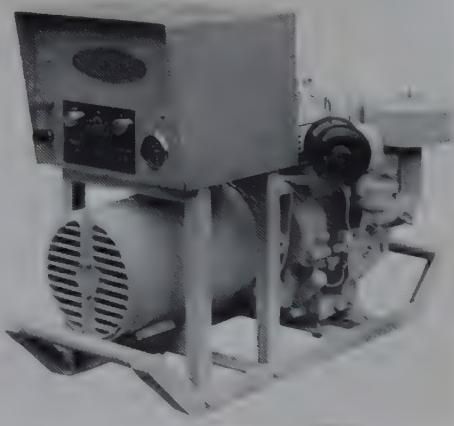
Non-slip floors

Witenite Tile non-slip floors have recently been installed in two factories of the confectionery industry. In one it was necessary to use a floating floor technique as steel-wheeled trucks carrying about one ton of ingredients had to travel over a steep fall. In a second

MACHINERY AND EQUIPMENT



KL fruit cooker and cooler.



Delite generator set.

factory, where another non-slip floor was needed in a sugar boiling area, Witenite Tiles were laid making the area easier to clean.

Circle 244

Programme controller

An improved operations controller, the Mk III Mangol, offers more extended built-in control facilities and greater programme flexibility together with simplified system planning and programme proving, it is stated. Constructionally the Mk III is built up from a plug-in Programme Unit with various combinations of standardised printed circuit boards such as step counters, out switching boards, and time counters. The machine is available in 25-, 50-, 75-, 100-step versions and depending on the complexity of the plant and the extent of hierarchical or

inter-active control that can be used, a single Mangol can control up to 100 steps in interlocked groups with a separate batch memory for each group.

Circle 245

Prevents can corrosion

For the prevention of post-process can rusting, Belgard, a viscous liquid produced by Ciba-Geigy (UK) Ltd, can be mixed with water and applied to tinplate to act as a drying agent and a surface protectant. It is used immediately after the cans have been cooked and cooled, so that the tinplate surface dries quickly. A thin protective film then remains on the can surface, keeps the tinplate bright, and prevents any tendency to rust during packaging, storage and distribution.

Circle 246

Bagging scale

An automatic high-speed bagging scale with inbuilt checkweigher has been developed by the Howe Richardson Scale Company. This unit provides the operator with the status of the scale at any time on a large viewer. The indicator shows zero tare check, main to dribble feed changeover position, and final cut-off precise weight. Changing from one weighment value to another and adjustment when changing products with differing bulk densities can be achieved simply and easily, it is stated.

Circle 247

Indicates temperature penetration

The Cook-Tube may meet the need for an indicator of temperature penetration into the food contents of jars and cans being processed through cookers and retorts. It consists of a small glass test tube containing a yellow pellet which turns into a formless dark-red mass when subjected to a temperature of between 246 and 252°F. Arnold R. Horwell Ltd, the UK distributors, state the recommended practice is to insert a Cook-Tube into the food, seal and cook the test containers in the same manner as the rest of the batch. If there is no colour change of the pellet, the food has not reached 246°F. Also from Horwells are cook record cards with lettering which changes colour when subject to cooking steam pressure, thus denoting the batch has not by-passed the cooker.

Circle 248

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Removes ice from floors

The model KEF 736 ride-on battery-powered floor-sweeping machine manufactured by Kent Engineering and Foundry Ltd had been modified to incorporate the Errut Industrial Scoura for the specialised use of removing and picking up ice and associated deposits from cold stores. The scouring unit is mounted as a double-headed unit on the front of the machine to provide a scouring width of 36in at each pass. This consists of four counter-rotating discs on which are mounted 12 steel scouring boxes. Three types of scouring box each with different star-wheel settings for varying conditions are available.

Circle 249



Errut/KEF ice clearing machine for cold stores.

Rigid stainless tube

United Flexible Metallic Tubing Co have introduced a range of thin-wall stainless steel rigid tube with outside diameters from 7.7mm to 102.86mm and in thicknesses from 0.102mm to 0.305mm. Lengths are limited only by transportation facilities. Stock tubes are produced in AISI grade 304-L stainless steel with descaled mat finish surface but the company state that other grades of stainless steel can be supplied.

Circle 250

Bottle and jar depalletiser

A new machine to reduce handling and increase output in the bottling industry has been designed and developed by R. S. Platt & Sons Ltd in conjunction with Reynolds Engineering. It is stated that the new Reynolds-Platt bottle and jar depalletiser can transfer a 4ft square pallet layer on to a single line conveyor in 30sec. Faster and slower operating speeds can be specified to customer's own requirements.

The pallet is placed on the input conveyor by a fork lift and power or manually fed into a lifting unit. This starts an automatic sequence of hoisting, indexing and the sweeping of the top layer on to the main plant conveyor. The cardboard interleaves are removed and the cycle is repeated until the last layer has been removed. The empty pallet is lowered and taken out by the discharge conveyor as the next full pallet is fed into the machine.

Handles loads of up to 1 ton.

Circle 251

Dispenses detergent sterilisers

BHC are now offering a plunger dispenser for use with their range of liquid detergent sterilisers of the Aseptopol range. A self-adhesive back enables it to be fixed to the wall and it is connected to the detergent drum by a length of clear plastic tube supplied with the dispenser. One press



Wall-mounted plunger dispenser from BHC.

on the spring-loaded knob allows 1½oz of detergent to be drawn up through the tube and ejected through the metal tap nozzle. Mainly of plastic construction, the dispenser has simple ball valves in the head and the foot of the tube to retain the liquid.

Circle 252

BRIEFS

A new waste compactor is the Pakabale from Portable Balers Ltd which directly compacts all types of normal refuse, wet or dry garbage, and food waste into strong waterproof coated cardboard cartons 27 x 14 x 28in in size which are sealed and easily stacked, it is stated.

Circle 253

An equilibrium dialyser, the Dia-norm from Oxy Fluid Control, enables the interaction between compounds of widely different molecular weights to be characterised using diffusion through a membrane to permit separate analysis of the initial and final equilibrium concentration of each substance in the carrier solution. For biochemical research.

Circle 254

A new range of chemical dosing pumps is being marketed by Michael Smith Engineers Ltd. Capacities range from 3 to 10 litre/hr and mass-produced diaphragm construction from standard parts keeps costs low.

Circle 255

All flowable materials can be handled by Kent-Moore's new range of transfer pumps designed to pass materials from containers or bulk tanks to points of application.

Circle 256

What is claimed to be the world's fastest machine for counting flat card and carton products is now available from Vacumatic Ltd. The Optomat will automatically count a stack of flat card or board at a rate of up to 25 000 units/min.

Circle 257

A new range of glass centrifugal pumps has been introduced by QVF in a variety of standard versions. Recent innovation is a range of pump units to which users can connect motors of their choice. Variety of impellers is available.

Circle 258

The latest Lodematic tippler features additional automatic control and automatic power hood providing trickle discharge. Capacity is up to 1 ton.

Circle 259

A new version of their Panda impulse conveyors has been introduced by AMF Legg, designed for applications where there is reduced headroom.

Circle 260

Two new accessories for their recently introduced SP1900 and SP1950 atomic absorption spectrophotometers have been introduced by Pye Unicam, the SP450 automatic sample changer and the DR10 digital printer.

Circle 261

A new range of intrinsically safe fluidic instrumentation for hazardous areas is announced by Neptune Measurement Ltd. Also useful for dusty or air-polluted conditions.

Circle 262

Applied to threads on studs, Crane Packing's Thred-Gard anti-seize compound eliminates seizure on boiler heat-shield doors, it is stated.

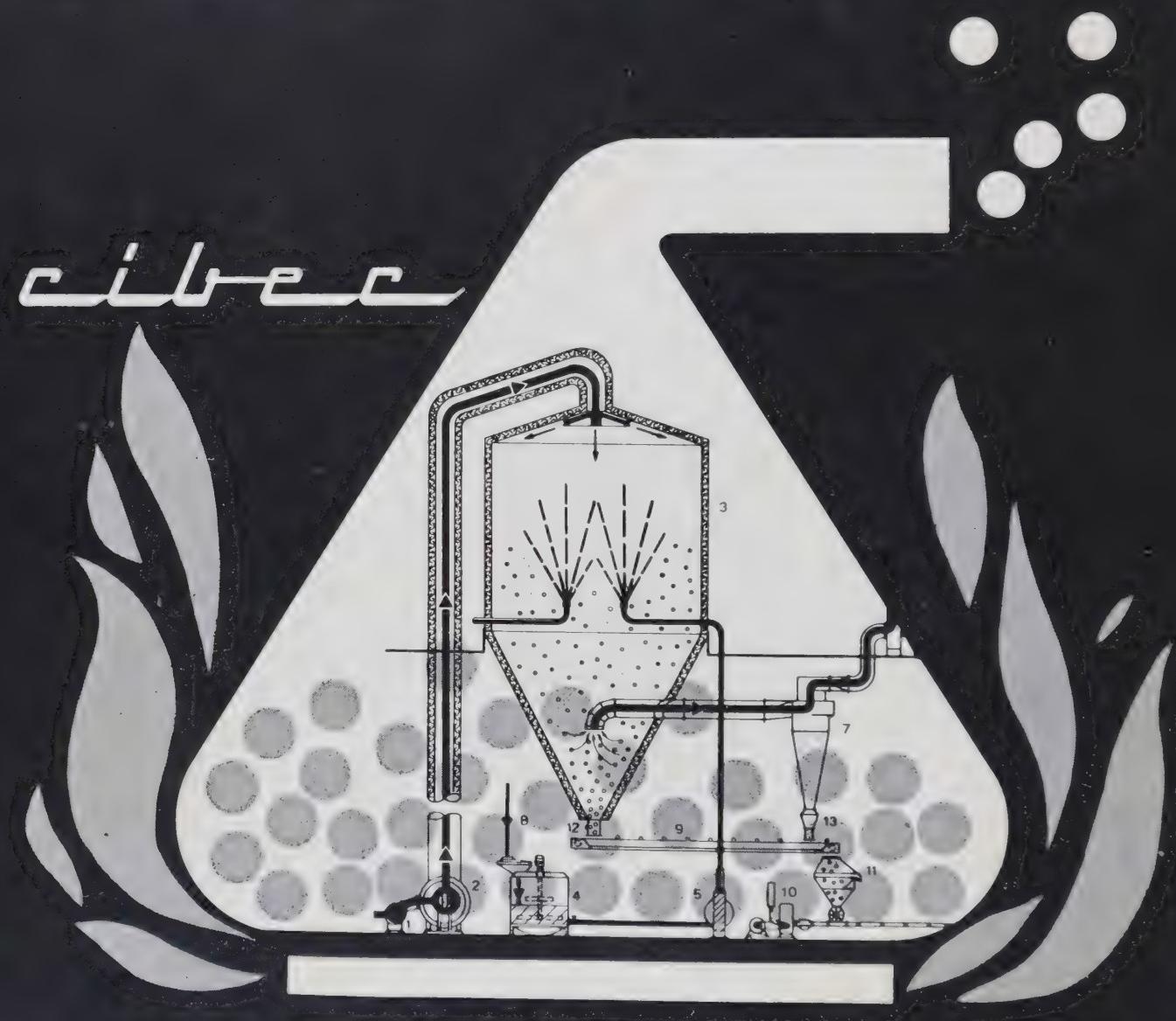
Circle 263

Flash steam and pump servicing problems have been eliminated by a condensate return unit at T. Wall & Sons (Meat & Handy Foods Ltd) Ltd, say Megator.

Circle 264

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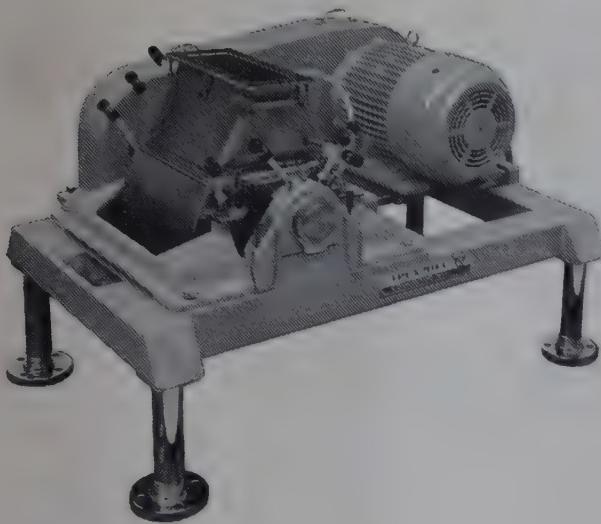
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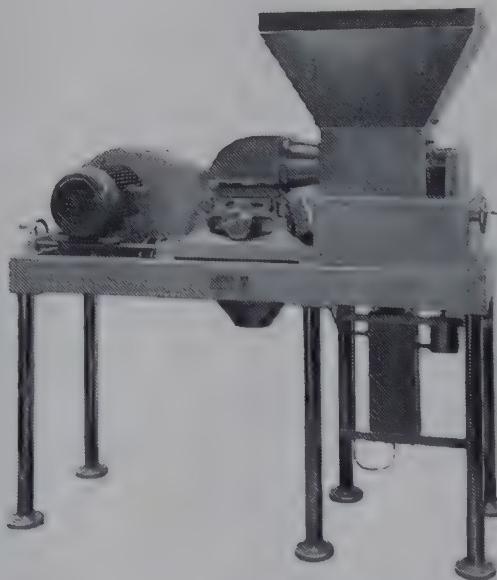
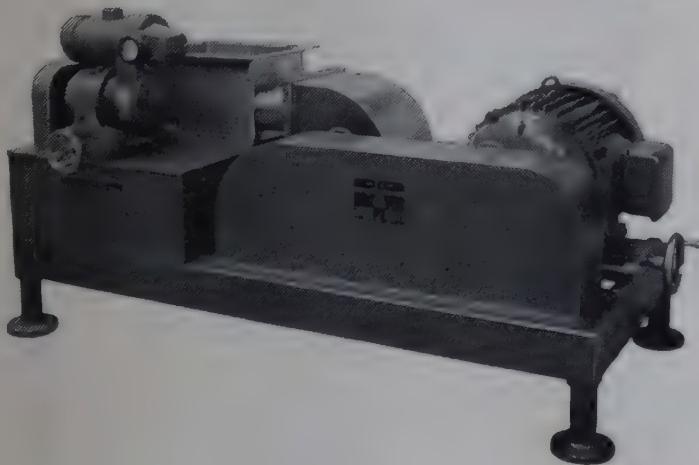
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Haddon House, Hindhead Road,
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invite applications from men experienced in the control of male and female staff for the position of

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Please write to Mr. J. A. Dicks,

**Country Kitchen Foods Ltd.,
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Meat Products

to control a department employing some 60 people producing high quality meat pies, sausage rolls and pasties. Reporting to the Production Director his main task will be to achieve production programmes — currently totalling some 150,000 units per week — whilst maintaining rigorous quality, hygiene and cost standards. The company is part of a vigorously managed public group which has doubled its turnover each year for the past 2 years to its present £10m. level. Aged around 30, candidates will probably have received their early training in the food industry followed by some 2 years' supervisory experience. They must have gained a sound knowledge of bakery techniques and have controlled a baking department manufacturing high quality meat products by flowline methods. Pension: re-location help. Location East Midlands. Please write — in confidence — to R. Tomkins reference AH.24173.

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- A relevant degree.
- A knowledge of food science and technology.
- A minimum of 3 years varied experience in new product development in the food industry.

For this position experience in the heat sterilization of foods is desirable but not essential.

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His salary will be according to his experience and qualifications, but it is envisaged the applicant would at present be earning around £5,000 or more p.a. Pension and other benefits will be in keeping with this high position.

Applications, with full details of your career to date, should be sent quoting reference CL 4960 on the envelope to:

Foster Turner and Benson Limited,
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Should there be any company to whom you do not wish your application to be forwarded please advise us in a covering letter omitting the reference number on the envelope.

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Candidates, aged 30–40, holding a good honours degree in a science subject, must have had several years' experience in research and development in the food industry and attained a senior position. Sound knowledge of food technology, particularly in respect of the canning of foods, is essential.

This appointment will probably be at Menstrie, Clackmannanshire, Scotland, in the first instance, but at a later date a Food Research and Development Department may be established in the Midlands.

The Company operates a non-contributory pension scheme and assistance can be given towards house purchase and removal expenses.

Please write, with brief personal particulars, for an application form to:—

**Central Staff Department,
The Distillers Company Limited,
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Applications, in writing, stating age, present salary and full details of experience should be addressed to Dr. Wilson M. Nicol, Project Manager, P.O. Box 68, Reading RG6 2BX.

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For further details contact: Head of Department of Science and Food Technology, College of Technology, Nuns Corner, GRIMSBY, Lincs. Grimsby (0472) 79292.

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Enquiries to The Secretary of the College, National College of Food Technology, St. George's Avenue, Weybridge, Surrey, from whom preliminary programme may be obtained.

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